



SOME
CONSIDERATIONS
Touching the
USEFULNESSE
OF EXPERIMENTAL
Naturall Philosophy,

Propos'd in a Familiar Discourse to a Friend,
by way of Invitation to the Study of it,

By the Honorable ROBERT BOYLE Esq;
Fellow of the ROYAL SOCIETY.



A Second Edition [since the first Published June 1663.]

W. G. 1616. School.

OXFORD,

Print, J. Santos

Printed by HEN: HALL Printer to the University, for
RIC: DAVIS. Anno Dom. 1664.

ex lib. A. G. B.

12. 1. 4. 7



The PUBLISHER to the READER.

IT is, Courteous Reader, part of the Satyr of Petronius against the Vice of his own Time. *Priscis temporibus, cum adhuc nuda Virtus placeret, vigeabant Artes ingenuæ, summumque certamen inter homines erat, ne quid profuturum sæculis diu lateret. Democritus omnium Herbarum succos expressit, & ne lapidum virgultorumque vis lateret, ætatem inter Experimenta consumpsit.* Other Examples of the like Industry he brings, and then concludes against the Laziness and Luxury of his own Age: *At Nos, saith He, ne paratas quidem Artes audemus cognoscere, sed accusatores Antiquitatis vitia tantum docemus & discimus.* It was for want of a Democritus or two that he casts this hard Censure upon his own Time. For, not-



The Publisher to the Reader.

withstanding all his Harangue in Commendation of some Ages which were antient to his Own, It is evident out of History, that there was never at once any great Number, who seriously and in earnest for the Benefit of Mankind applyed themselves to these severe Scrutinies of Natural Bodies. It is true that now and then, in all Centuries from the Beginning of the World, there have appear'd some Persons of a Nature more refin'd, as if indeed (according to that Phancy of the Old Poets) some *Promethæus* had made them either of another Metall, or of another Temper, from the Vulgar, utterly above all Mixture with, or Embasement by the common Fashions of this World; who did make it the End of their Lives, by Severing and Mixing, Making and Marring, and multiplying Variety of Experiments on all Bodies, to discover their hidden Vertues, and so to enlarge the Power and Empire of Man. But these were ever very few and singular. Even in that so much celebrated Time of *Democritus* these Studies were so rare, that his usual Exercise of the Anatomy of Beasts was look'd upon, as that which made the Soundnesse of his Mind questionable, even as a Spice of Madnesse in him: and probably much more might the Vulgar of his Age have been amused, had they

they ſeen him torturing Minerals and Metals in the more toiliſome Anatomy of Fire.

Now if it be a diſhonourable Crimination to an Age, that it hath brought out no Perſons who make it their great Endeavour *Ne quid profuturum ſaculis liteat*: and if the Diſcovery of one or two perſons of this Kind be enough to expiate for, and take off the Diſhonour of the Proletarian Lazineſſe and Luxury of the reſt, I think I may juſtly eſteem that the exhibiting to the World the Hiſtory of the Studies of the Honourable Author of this Piece may ſerve to be the Apology and Defence of our Age againſt ſuch Cenſures as that wherewith the newly cited *Satyriſt* ſtained his own Time.

And this was one great Reason that hath made me very forward to promote the Publication of This, and diſverſe other Writings of the ſame Noble Author. For were there only Tokens of Endeavour in Them, the proof of This Endeavour (even without Attainment) ought to wipe off all Imputations of this nature. But this Motive (though I do account that by exhibiting this Expiation I do ſomewhat oblige the Age, whoſe Honour is thereby defended, yet) was far from being the moſt great and forcible. For the Excellence of the Works themſelves,

The Publisher to the Reader.

selves, even as soon as they fell from the pen of the Author, did long since in all Equity set an *Imprimatur* on them.

*Nec sumant aut ponunt secures
Arbitrio popularis Aura.*

Epicurus, when he was casting up the account of his life; upon the very Day of his Death, mentions a very great pleasure that he even then took in two Parts of his former Studies: And these were his *Rationes*, and his *Inventa*; *Points well argued, and things happily found out.* The two very same particulars are principally conspicuous in this ensuing Piece. There are good Conclusions against the Enemies of the Being and Providence of God in the First Part, and in the Second there be Notices of divers *Inventa* profitable to the Use of Man. By the one sound Notions are proposed to the Readers apprehension from the Contemplation of God's Creation and Government of the World, and thereby good Matter is suggested to his Affections for the Advancement of his Devotion; by the Other, there are divers things deliver'd, which may tend to enlarge Man's power of doing Good: By them, in the whole, both our Honour to God, and our Charity to our Neighbors may

may be assisted: in which two the Substantial part of all the most Noble, not only Humane but Christian Vertues, both Speculative and Practical, are certainly contained.

I must not omit, that an Argument of this Nature, at this Time, may justly be commended for its Seasonableness, when divers Persons, who know not the way of *Experimental Philosophy*, and are loath now to give themselves the trouble of learning it, have been making some attempts, very unthankfully, to traduce both it, and its Promoters.

These Considerations passed with me for Reasons, and had upon me this force and prevalence, that as soon as I had the Authors leave, I durst not forbear the committing of them to the Press, notwithstanding his Many arguments, which were plausible enough to the Contrary: as, namely, that much of the *First Part* was written when he was of so immature Years, that should I be particular concerning his Age then, to any person who hath read the piece, the paucity of such Instances might justly make me despair of begetting Credit to my Relation. Another Objection was, That, though his Method did of necessity lead him to it, yet it might be look'd upon as unbecomming for Him to meddle

The Publisher to the Reader.

meddle with the Physicians Art, of which he never did, (nor could, by reason of his Native Honour) make any Profession. But these Oppositions being raised upon points of Curiosity in Ceremony and outward *Decorum*, were of little weight, when the forementioned Noble Offices of Charity and doing good were in the other Scale.

The greater Question was. Suppose them to be publisht, But why now? Why so soon? Should not rather the Edition have been delay'd, untill it might have come out together with *The Second Section of the second Part*? (which discovers the Use that may be made of Experimental Learning, to advance the Empire of Man over other Creatures) or untill the Common Preface, and some other little Tracts, all written long since, and intended to accompany this, might be revised by the Author; or at least untill the Author might have had leisure to have made some more new and full Animadversions to the Receipts and processes contain'd in the Appendix? The Consideration which answer'd this Objection was, That this Piece, as now Printed alone, would make (as you see it doth) a very competent Book, which would have by it Self the perfection, if not of the Whole yet of a more principal part; and of that part, which to
Professors

5

The Publisher to the Reader.

Professors or Candidates of Learning is most desirable. And then the Author's Avocations and other Studies being so many, that we could prefix no certain time for the complement of the mention'd remaining parts, I was loath to hazard the Preservation of These by deferring the Impression; since I know there is no Security of the continuance of those Writings which are reposed only in single, or at most in few written Copies. I remember, the Author had once lost for a good while one of these very Essays which are now here Printed, and put beyond that Danger for the future. Besides other Casual accidents, the very Contingency of Humane life, and the chance of a man's papers after Death, (For to them the Question of King Solomon is most proper and pertinent, *Who knows whether then they may happen to fall into the hands of a Wise man or a Fool?*) were of force enough to perswade me to secure these, when it was in my power, unto the Common Use. Would not Printing in all probability have preserv'd unto Us that Universal History of Vegetables from the Cedar of *Lebanus* unto the Moss that groweth upon the Wall, written by that Wise and Learned King, and the losse of which we now in vain lament? Would not Printing have sav'd that Excellent Book of *Democritus*, which he inscribed his ΧΕΙΡΟΚΜΗ.

[* *]

TA.

The Publisher to the Reader:

T A O I E X P E R I M E N T S *of his own personal Trial*, so utterly lost, that the Name of the piece is not mention'd among the Catalogue of his Writings in *Laertius*? And may not the Printing of this Piece be a means of the preservation (besides the Notional part) of divers very useful ΧΕΙΡΟΚΜΗΤΑ of the Honourable Author? who hath been ever unwearied in the Tryal of all probable Experiments, that may increase the Light or advance the Profit of Mankind, & whom I may now name to be that most Learned & Noble Person Mr *Boyle*: For the ceasing of certain Considerations that before made him willing to have his name suppress'd, & the general very good acceptance of this Discourse have extorted from his Honor that He no longer conceal Himself to be the Author.

But before I leave the Reader, I must give him this single Advertisement, that the Passages included within the *Paratheses* or *Crotchets*, as the Press stiles them, that is, between any two such Marks as these [] were inserted long since the writing of these Essays, upon the Relection of some parts of the Book before He sent it to me: Which I therefore did so distinguish, and do intimate, that there may appear no inconsistency in our Author, and the Reader may not marvel to find somethings very Recent in a Book written several Years agoe. Farewell.

R O: SHARROCK.



6

The Author's
ADVERTISEMENT about the following
ESSAYS.



That the Title of the following Treatise might not raise in the Reader an Expectation of more then he will find in the Book, I think my self oblig'd to inform him, That, though it come not forth before, divers parts were sent to the Presse in 1660, or 1661 and this present Year 1663, yet the very Last Essay of it was written divers Years before: Since when those Papers were left, sometimes in the hands of Friends, and sometimes in distant places where I could not come at them: which I mention, that the Reader may neither wonder nor blame Me, if he now meet with some things in them that have already been published by others, or are more vulgarly known then my way of mentioning them implies. For it may, this notwithstanding, very well be, that when I writ them, nobody had yet lighted on some of them, and that others of them did then but begin to be
[* * *] taken

The Authors Advertisement

taken notice of. And as for the Five first Essays, which treat of The Usefulness of Natural Philosophy to the Mind of Man, though by my addressing them all the way to the Gentleman I call Pyrophilus, they may seem to have been Originally written to the same Person, and about the same time with the Essays, that make up the Second Part; yet indeed a great Portion of the First part was written, as I remember, 10 or 12 years ago, (when I was scarce above 21 or 22 years old) to another Friend, to whom the Considerations that serv'd to confirm Piety, and excite Devotion, were far more acceptable then those that were more purely Physiological: so that having, whether through laziness, or want of leisure contented my self to substitute the name of Pyrophilus for that of my other Friend (who was not unwilling I should do so) in a Discourse written when I was so Young; I would not have the Reader think, that I do now so approve of all those Youthful Discourses (which I therefore suffer to pass abroad without a Name) as to think all the Tenets they propos'd to be irrefragable Truths, or all the Reasonings they contain, to be Demonstrative; and that I would at present have my Judgment estimated according to their Cogency. But yet I do without much Reluctancy comply with those Friends, who would by no means consent, that the Five first Essays of this Treatise should not come forth with the Rest; partly because not
writing

7
About the following Essayes:

writing all things for all Readers, I hold it not unfit to publish something to gratify those, who desire with me to be both excited and assisted to admire and praise the Great and Wise Author of all things; partly because the Treatise would seem main'd and incomplete, if the latter Essays should come abroad without the Rest; and partly too because Learned Men have been pleas'd to assure me, that those Essays are not destitute of Notions and Ratiocinations, that are not altogether vulgar or contemptible. How ever those Readers, that either cannot relish, or at least desire not any thing, but what is meerly Physiological, may, thus advertis'd, passe by the former part of this Treatise, and content themselves to read over the Latter, though they who shall take the Pains to read Both, will not perhaps think their Labour lost: Since I have taken Care to leave even the former Part as little disfurnish'd with Experiments and useful Notions, as, the Argument consider'd, I conveniently could. And since also for the Paucity of such things in the First Part, I have endeavour'd to make amends in the Second, which is almost wholly Physiological; concerning which nevertheless I shall admonish the Reader: And indeed the whole Tenets that make up the following Book, are by no means to be look'd upon as Published for an accurate Treatise of the Usefulness of true Physiology, but as Familiar Writings, that want only the formality of
Salve

The Author's Advertisement

Salve and Vale to passe for Physiological and Medical Epistles; consisting of such loose Observations, as I thought might be this way preserv'd, and did not so properly belong to my other Writings as they seem'd fitted for the use, and whereto I have applyed them; namely, that being drawn up together into one Treatise, their Union might enable them to make the greater Impression, and might (some what at least) recommend that sort of Learning to a Beginner. And one thing that must be especially comprehended in this Admonition is, that the Particulars I have mentioned, to shew of what use Chymical Experiments may be to a Physitian, are not, possibly, the chiefest that even I could set down, if I were not restrained by some justifiable Considerations; especially till I see what Entertainment, the things I now venture abroad, will meet with there: Some of those I reserve, appearing such to me, that I confess I do not slight them enough to be fond of obtruding them upon the Publick, if I thought they would not be welcome to it. And I do so little desire to have, what I have written, look'd upon as the most that can be said, to shew the Usefulness of Experimental Philosophy, that I scruple not to acknowledge there are things which incline me to suspect, that some in the world, though not particularly known to me, may have Arcana, to which most of the Processes I reserve, as well as all that is commonly known in Chymistry, may prove little more than Trifles.

3

OF THE
VSEFULNESSE
OF
Naturall Philosophy.

The First Part.

Of its Vsefulnessse in reference to
the Minde of Man.

ESSAY. I.



Of the USEFULNESSE of
EXPERIMENTALL PHILOSOPHY,
Principally as it Relates to the
MIND of MAN;



THE NATURAL PHILOSOPHY wont to be taught in most Schools, being little other then a Systeme, of the Opinions of *Aristotle*, and some few other Writers, is not, I confesse, *Pyrophilus*, very difficult to be Learned, as being attainable by the perusall of a few of the more Current Authors. But, *Pyrophilus*, that EXPERIMENTALL PHILOSOPHY,

The reason why the Author endeavors to possess the Pyrophilus with the true value of Experimental Philosophy.

which you will find treated of in the following Essays, is a Study, it duely prosecuted, so difficult, so chargeable, and so useless, that I think it requisite, before I propose any particular Subjects to your Enquiries, to possess you with a just value of true and solid Physiology; and to convince you, That by endeavouring to addict you to it, I invite you not to mispend your time or trouble on a Science unable to merit and requite it. In order, *Pyrophilus*, to the giving you this satisfaction, Give me leave to mind you, that it was a saying of *Pythagoras*,

B

worthy

worthy so celebrated a Philosopher, That there are two things which most *ennoble* Man, and make him resemble the Gods; *To know the Truth, and To do Good*. For, *Pyrophilus*, that Diviner part of Man, the Soul, which alone is capable of wearing the Glorious Image of its Author, being endowed with two chief Faculties, the Understanding and the Will, the former is blest and perfectionated by Knowledge, and the latter's Loveliest and most improving property is Goodness. A due Reflection upon this excellent Sentence of him to whom Philosophers owe that modest name, should, me thinks, *Pyrophilus*, very much endear to us the Study of Naturall Philosophy. For there is no Humane Science that does more gratifie and enrich the Understanding with variety of choice and acceptable Truths; nor scarce any that does more enable a willing mind to exercise a Goodness beneficiall to others.

That Experimental Philosophy is conducive to the improving of Mans Understanding and to the encreasing of Mans power.

To manifest these truths more distinctly, *Pyrophilus*, and yet without exceeding that brevity my Avocations and the Bounds of an Essay exact of me, I shall, among the numerous advantages accruing to Men from the Study of the Book of Nature, content my selfe to instance only in a Couple, that relate more properly to the *Improving of Mens Understandings*, and to mention a few of those many, by which it *encreases their Power*.

The two chief advantages which a reall acquaintance with Nature brings to our Minds, are, First, by instructing our Understandings and gratifying our Curiosities; and next, by exciting and cherishing our Devotion.

Arguments to prove that Mans Curiosity for knowledge is much thereby gratified.

And for the first of these: since, as *Aristotle* teacheth, and was taught himself by Common Experience, *all Men are Naturally desirous to Know*: that Propensity cannot but be powerfully engaged to the Works of Nature, which being incessantly present to our senses, do continually sollicite our Curiosities: Of whose potent inclining us to the Contemplation of Natures Wonders, it is not perhaps the inconsiderable Instance, that though the Naturall Philosophy hitherto taught in most Schools,

Schools, hath been so Litigious in its Theory, and so barren as to its Productions; yet it hath found numbers of Zealous and Learned Cultivators, whom sure nothing but Mens inbred fondness for the Object it converses with, and the end it pretends to, could so passionately devote to it.

And since that (as the same *Aristotle* taught by his master *Plato* well observes) Admiration is the Parent of Philosophy, by engaging us to enquire into the causes of the things at which we marvel; we cannot but be powerfully invited to the Contemplation of Nature, by living and conversing among Wonders, some of which are obvious and conspicuous enough to amaze even ordinary Beholders; and others admirable and abstruse enough to astonish the most inquisitive Spectators.

The bare prospect of this magnificent Fabrick of the Universe, furnished and adorned with such strange variety of curious and usefull Creatures, would suffice to transport us both with Wonder and Joy, if their Commonness did not hinder their Operations. Of which Truth Mr *Stephens*, the famous Oculist, did not long since supply us with a memorable Instance: For (as both himselfe and an Illustrious Person that was present at the Cure informed mee) a Maid of about Eighteen yeares of Age, having by a couple of Cataracts, that she brought with her into the World, lived absolutely blind from the moment of her Birth; being brought to the free Use of her Eyes, was so ravish'd at the surprizing spectacle of so many and various Objects, as presented themselves to her unacquainted Sight, that almost every thing she saw transported her with such admiration and delight, that she was in danger to loose the eyes of her Mind by those of her Body, and expound that Mystickall Arabian Proverb, which advises, *To shut the Windowes, that the House may be Light.*

But if the bare beholding of this admirable Structure is capable of pleasing men so highly, how much satisfaction, Py-

A relation of the transport and surprisall of a Maid born blind: when being about 18. yeares old, she obtained the first sight of the various objects of the World instantly presented her with.

That the know-
ledge of the in-
ward Archite-
cture, and con-
trivances of
Nature is more
delightfull then
the sight of the
outward shapes.

Pyrophilus, may it be supposed to afford to an Intelligent Spectator, who is able both to understand and to relish the admirable Architecture and skilfull contrivance of it: For the Book of Nature is to an ordinary Gazer, and a Naturalist, like a rare Book of Hieroglyphicks to a Child, and a Philosopher: the one is sufficiently pleased with the Ordneffe and Variety of the Curious Pictures that adorn it; whereas the other is not only delighted with those outward objects that gratifie his sense, but receives a much higher satisfaction in admiring the knowledge of the Author, and in finding out and enriching himselfe with those abstruse and vailed Truths dexterously hunted in them.

Examples and
Instances of the
prevalence of the
pleasure that a-
rises from the
attainment of
knowledge.

Yes, *Pyrophilus*, as the Understanding is the highest faculty in Man, so its Pleasures are the highest he can naturally receive. And therefore I cannot much wonder that the famous *Archimedes* lighting in a Bath upon an Expedient to resolve a perplexing difficulty in Naturall Philosophy, should leap out of the Bath, and run unclothed like a madman, crying nothing but "Eureka, Eureka, I have found it, I have found it." Nor do I so much admire as deplore the fatally venturous curiosity of the Elder *Pliny*, who, as the Younger relates, could not be deterr'd by the formidable-nesse of the destructive flames vomited by *Vesuvius*, from endeavoring by their Light to read the Nature of such Vulcanian Hills; but in spite of all the dissuasions of his Friends, and the affrighting eruptions of that hideous Place, he resolved that Flaming Wonder should rather kill him, then escape him; and thereupon approach'd so neer that he lost his Life to satifie his Curiosity, and fell (if I may so speak) a Martyr to Physiologie. For we daily see Alchymists hazard their lives on Minerall Experiments in Furnaces, where though the fires are not so vast and fierce, as those that *Pliny* went to consider; yet the (dangerous when not pernicious) Fumes do sometimes prove as fatall.

One

One would think, *Pyrophilus*, that the conversing with dead and stinking Carcasses (that are not only hideous objects in themselves, but made more ghastly by putting us in mind that our selves must be such) should be not only a very melancholy, but a very hated imployment. And yet, *Pyrophilus*; there are Anatomists who dote upon it; And I confesse its Instructivenesse hath not onely so reconciled me to it, but so enamored me of it, that I have often spent houres much less delightfully, not onely in Courts, but even in Libraries, then in tracing in those forsaken Mansions, the inimitable Workmanship of the Omniscient Architect.

The curious Works of famous Artificers, are wont to invite the Visits, and excite the wonder of the generality of inquisitive Persons. And I remember, that in my Travels, I have often taken no small pains to obtain the pleasure of gazing upon some Masterpiece of Art: But now, I confesse, I could with more delight look upon a skilfull Dissection, then the famous Clock at *Strasburg*. And, methinkes, *Aristotle* discourses very Philosophically in that place, where passing from the consideration of the sublimest productions of Nature, to justifie his diligence in recording the more homely Circumstances of the History of Animals, he thus discourses: *Restat (saith he) ut de animanti natura differamus, nihil pro viribus omittentes vel vilius vel nobilius. Nam & in iis qua hoc in genere minus grata nostro occurrunt sensui, Natura parens & author omnium miras excitat voluptates hominibus, qui intelligunt causas & ingenuè Philosophantur. Absurdum enim nulla ratione probandum est, si imagines quidem rerum naturalium non sine delectatione propere inspiciamus, quòd ingenium contem-
plamur quod illas considerit; id est, artem pingendi aut fingendi; rerum autem ipsarum natura ingenio miraque solertia constitutam contemplationem non magis prosequamur atque exoscele-
mur, modo causas perspicere valeamus: It remains (saith he) that we discourse of the natures of Animals, being circumspect*

That the know-
ledge of the most
curious Artifi-
ciall works is
not more delight-
full then the
knowledge of
Naturall.

*Arist: de Part:
Animalib. 1. c. 3*

to omit none either of the nobler, or inferior sort : For even from those Creatures which less please our sense, does the universal Parent, Nature, afford incredible contentments to such Persons, as understand their causes, and Philosphize ingenuously. Since it were absurd and inconsistent to reason, if we should behol'd the Portraictures of Natural things with delightation, because we observe the accurateness wherewith they are designed namely, the skill of Painture or Sculpture ; and not much more off it and pursue the contemplation of things themselves, contrived by the exquisite Artifice and Sagacity of Nature, provided we be able to understand their causes. And the better to make out to you, Py-

That the delight
herein is altogether
inoffensive.

rophilus, the delightfulness of the study of Natural Philosophy, let me observe to you, That those pleasing Truths it teacheth us, do highly gratifie our intellectual Faculties, without displeasing any of them : for they are none of those Criminal Pleasures, which injur'd and incens'd Conscience does very much allay, even in the Fruition, and turns into Torments after it. Nor are the Enquiries I am recommending of that trifling and unserviceable sort of Employments, which though Conscience condemns not as unlawful for a Christian, Reason disapproves as not worthy of a Philosopher ; and wherewith to be much delighted, argues a weakness ; as to be pleased with Babies and Whistles, supposes unripe and weak Intellectuals : But the contemplation of Nature, is an Employment, which both the Possessors of the sublimest Reason, and those of the severest Virtue, have not onely allowed, but cultivated. The Learned Author of the Book *De Mundo*, ascrib'd to Aristotle, begins it with this Elogium of Natural Philosophy : *Mibi quidem sæpe* (sayes he) *divina quædam res, Alexander, admirationeq; digna visa est Philosophia, præcipuè vero in ea parte in qua sola ipsa sublimè sese tollens ad contemplandas rerum naturas, magno illic studio contendit existentem in eis veritatem pernoscere.* Philosophy (saith he) O Alexander, hath oftentimes seem'd to me a Divine and Admirable Thing ; but chiefly

Instances of the
Esteeme diverse
ancient Philoso-
phers had for it.

chiefly, that part of it, which aspires to contemplate the Natures of things, imploying its utmost power in searching out the truth contained in them. The reasonableness of which Commendation, he handsomely enough prosecutes in the subsequent Discourse: To which I shall refer you, that I may proceed to

minde you, that *Pythagoras, Democritus, Plato*, and divers others of those whose Wisdom made after-ages reverence Antiquity, did not onely esteem the Truths of Nature worth studying for, but thought them too worth Travelling for as far as those Eastern Regions, whose Wise-men were then cry'd up for the best Expositors of the obscure Book of Nature. And that severe Teacher, and perswasive Recommender of the strictest Virtue; *Seneca* (whose eminent Wisdom made him invited to govern Him that was to govern the World, and who so often and so excellently presses the husbanding of our time) does not onely in several passages of his Writings praise a contemplation of Nature, but Writes himself seven Books of Natural Questions, and addresses them to that very *Lucilius*, whom in his Epistles he takes such pains to make compleatly Virtuous; and in his Preface, after he had said according to his manner, loftily,

Equidem tunc Naturæ rerum gratias ago, cum illam non ab hac parte video, quæ publicæ est, sed cum secretiora ejus intravi, cum disco quæ Universi Materia sit, quis

Seneca in Pref. lib. 1. Nat. Quæst.

Author, aut Custos, &c. Then do I pay my acknowledgements to Nature, when I behold her not on the out-side, which is obvious to publick view, but am enter'd into her more secret Recefles: when I understand what the Matter of the Universe is, who its Author, and Preserver, &c. He concludes in the same strain, *Nisi ad hæc admitterer, non fuerat opera pretium nasci*: Had I been barr'd from these things, it would not have been worth coming into the World. And to adde what he excellently says in another Treatise, *Ad hæc querenda natus* (says he, having spoken of Enquiries concerning the Universe) *estima quàm non multùm acceperis temporis, etiam si illud totum sibi vindices, cui*

lises

licet nihil facilitate eripi, nihil negligentia patiatur excidere, licet horas suas avarissimè servet, & usque in ultima ætatis humana terminos procedat; nec quicquid illi ex eo quod Natura constituit fortuna concutiat; tamen homo ad immortalium cognitionem nimis mortalis est. Ergo secundum Naturam vivo, si totum me illi dedi, si illius Admirator Cultorq. sum. Natura autem utrumq. facere me voluit & agere, & contemplationi vocare:

Sen. de Oib.
Cap. 6. 32

Being born designedly for searching out these things, consider that the portion of time allotted to Man, is not great, if this study should ingross it all; since though he should preserve his hours with the greatest frugality all his life-time, not suffering any to be stolen from him, or slide away negligently, and never be disturbed by Accidents of Fortune in the Employment Nature has appointed him, yet is he too Mortal to attain the knowledge of Immortal Things: Wherefore, I live agreeably to Nature, when I give up myself wholly to Her, and am Her Admirer and Adorer: Moreover, Nature hath designed me to act, and employ my self in Contemplation. How far Religion is from dis-approving the Study of Physiology, I shall have occasion to manifest ere long, when we shall come to shew, That it is an act of Piety to offer up for the Creatures the Sacrifice of praise to the Creator; For, as anciently among the Jewes, by vertue of an Aaronical Extraction, Men were born with a Right to Priesthood; so Reason is a Natural Dignity, and Knowledge a Prerogative, that can confer a Priesthood without Unction or imposition of Hands. And as for Reason, that is so far from making us judge that Employment unworthy of Rational Creatures, that those Philosophers (as *Aristotle, Epicurus, Democritus, &c.*) that have improv'd Reason to the greatest height, have the most seriously and industriously employ'd it to investigate the Truths, and promote the study of Natural Philosophy.

How this Study
consists with
Religion.

And indeed, that noble Faculty call'd Reason, being conscious of the great progress it may enable us to make in the knowledge

knowledge of Natures Mysteries, if it were industriously imploy'd in the study of them, cannot, but like a great Commander, think it self disobligh'd by not being considerably employ'd. And certainly we are wanting to our selves, and are guilty of little less than our own Degradation, that being by Gods peculiar vouchsafement, endowed with those noble Faculties of Understanding, and Discoursing, and plac'd amidst a numberless variety of Objects, that incessantly invite our Contemplations, can content our selves to behold so many Instructive Creatures which make up this vast Universe, whose noblest Part we are desing'd to be, with no more, or but little more discerning Eyes then those less favored Animals, to whom Nature hath denyed the Prerogative of Reason, as we deny our selves the use of it. *Aristotle* well observes, that among Animals, Man alone is of an erected Stature; and adds, That it is because his Nature hath something in it of Divine: *officium autem Divini, (inter's he) est intelligere atque Sapere: The Qualifications of a Divine Being, are Understanding and Wisdom.* And it cannot but mis-becomè the dignity of such a Creature to live Ignorant or Unstudious of the Laws and Constitutions of that great Commonwealth (as divers of the Antients have not improperly stiled the World) whereof he is the eminentest part: And were we not lulled asleep by Custom or Sensuality, it could not but Trouble, as well as it Injures a reasonable Soul to Ignore the Structure and Contrivance of that admirably Organiz'd Body in which she lives, and to whose intervention she owes the Knowledge she hath of other Creatures.

The absurdity of not imploying humane faculties on the contemplation of those objects to which they are fitted,

De Part. Anim. lib. 4. c. 10.

'Tis true indeed, that even the generality of Men, without making it their design, know somewhat more of the Works of Nature, then Creatures destitute of Reason, can, by the advantage of that Superior Faculty, which cannot but even unurg'd, and of its own accord make some, though but slight, reflections on the Information of the Senses: But if those impressions be onely receiv'd and not improv'd, but rather neglected;

illustrated by the
 Similitude of a
 Spider in a Pa-
 lace taking notice
 of nothing beside
 her own Cob-
 web.

lected; and if we (contenting our selves with the superficial account given us of things by their obvious Appearances and Qualities) are beholding for that we know, to our Nature, not our Industry, we faultily loose both one of the noblest Employments, and one of the highest Satisfactions of our rational Faculty: And he that is this way wanting to himself, seems to live in this magnificent Structure, call'd the Universe not unlike a Spider in a Palace; who taking notice onely of those Objects that obtrude themselves upon her Senses, lives ignorant of all the other Rooms of the House, save that wherein she lurks; and discerning nothing either of the Architecture of the stately Building, or of the Proportion of the parts of it in relation to each other, and to the intire Structure, makes it her whole business, by intrapping of Flies to continue an useles Life; or exercise her self to spin Cob webs, which though consisting of very subtle Threads, are unserviceable for any other then her own trifling uses. And that the contemplation of the World, especially the higher Region of it, was design'd for Mankind's Employment by Nature's Self, even the Heathen Poet (perhaps instructed by Aristotle) could observe, who Sings,

*Pronaq̃, cum spectent Animalia cætera terram,
 Os homini sublime dedit, cælumq̃, tueri
 Fussit, & erectos ad sidera tollere vultus.*

*Wise Nature, framing Brutes with downward looks,
 Man with a lofty Aspect did endue,
 And bad him Heaven with its bright Glories view.*

The opinion that
 Ovid, Seth, A-
 braham, and So-
 lomon had of
 Mankind's fitness for
 the Study of A-

I might annex, Pyrophilus, the Story Josephus tells us in the beginning of his *Jewish Antiquities*, that 'twas the holy Seth and his Posterity (who are in *Genesis* stil'd the Sons of God) that were the Inventers of Astronomy, whose more Fundamental Observations (to perpetuate them to Man-kind, and sever

sever them from the foretold destructions by Fire and Water) they engraved upon two Pillars, the one of Brick, the other of Stone; the latter of which our Historian reports to have been extant in Syria in his time. And it is an almost uncontroll'd tradition, that the Patriarch whom God vouchsafes to stile *his Friend*, was the first Theacher of Astronomy and Philosophy to the *Egyptians*, from whom, long afterwards, the *Grecians* learn'd them. *Berosus* himself records him to have been skill'd in the Science of the Stars, as he is cited by *Josephus*, (*Ant. lib. 1. c. 8.*) who a little after speaking of *Abraham* and the *Egyptians*, expressly affirms, that *Numerorum scientiam & siderum benignè illis communicavit: Nam ante Abrahami ad se adventum, Egyptii rudes erant hujusmodi disciplinarum; quæ à Chaldeis ad Egyptios profecta, hinc ad Græcos tandem pervenerunt.*

Astronomy and other Physiology,

*Isaiah 41. 9.
James 1. 23.*

But, *Pyrophilus*, to put it out of question that the sublimest reason needs not make the Possessor of it think the Studie of Physiologie an Employment below him, that Unequall'd *Solomon*, who was pronounced the Wisest of men by their omniscient Author, did not onely Justifie the Study of Naturall Philosophy by addicting himselfe to it, but ennobled it by teaching it, and purposely composing of it those matchlesse Records of Nature, from which I remember some Jewish Authors relate *Aristotle* to have borrowed diverse; which (if it be true) may well be supposed to be the choicest pieces that adorn'd his Philosophie, and which Providence perhaps depriv'd the World of, upon such a score as it did the Jewes of the Body of *Moses*, lest men should Idolize it; or as some Rabbies are pleas'd to informe us, lest vicious men should venture upon all kinds of Intemperance, out of Confidence of finding out by the help of those excellent Writings the Cure of all the distempers their dissoluteneffe should produce.

Why Providence might deprive us of solomons Physiology,

And, *Pyrophilus*, yet a little further to discover to you, the Delightfulness of the Contemplations of Natures workes, Give me leave to mind you of their almost unimaginable Variety

riety, as of a Property, that should methinkes not faintly recommend Naturall Philosophy, to curious and active Intellectuals.

Of the delight
that may arise
from the variety
of objects which
Nature produces

For most other Sciences, at least as they are wont to be taught, are so narrow and so circumscrib'd, that he who has read one of the best and recentest Systems of them, shall find little in the other Books publisht on those subjects, but disguis'd repetitions; and a diligent Scholar may in no long time learn as much as the Professors themselves can teach him. But the objects of Naturall Philosophy, being as many as the Laws and Works of Nature are, so various and so numberlesse, that if a Man had the Age of *Methuselah* to spend, he might sooner want time then matter, for his Contemplations: And so pregnant is each of that vast multitude of Creatures, that make up the Naturalists Theme, with usefull matter to employ Mens studie, that I dare say, that the whole life of a Philosopher spent in that alone, would be too short to give a full and perfect account of the Natural properties and Uses of any one of severall Minerals, Plants, or Animals that I could name. 'Tis an almost incredible variety of Vegetables, that the teeming Earth, impregnated by Gods *Pro-ducatur Terra*, does in severall Regions produce. Botanists have a pretty while since, reckon'd up near 6000 Subjects of the Vegetable Kingdom; since when, divers other not-described Plants have been observed by Herbarists; the chief of which will, I hope, be shortly communicated to the World, by that Curious and Diligent Botanist my Industrious Acquaintance, Dr. *Hew*, to whom I not long since presented a peculiar and excellent kind of Pepper, whose Shell tastes not unlike Cinamon, and smells so like Cloves, that with the Odor I have deceived many, which he confess't to be new even to him; it having been lately gathered in *Jamaica* (where it abounds) and presented me by the inquisitive Commander of the English Forces there. And yet, *Pyrophilus*, this great variety of Simples could not deter either Ancient or Modern Inquirers from Writing

That there be above 6000 Subjects of the vegetable Kingdom.

Of an excellent Jamaica pepper newly brought over

Writing entire Treatises of some particular Ones. So *Pliny* tells us, ^a That *Themison* the Physitian publisht a Volume (for so he call'd it) of that vulgar and dispis'd Herb call'd *Plantain*: So the same ^b Author tells us, That *Amphilocus* writ a Volume *De Medica Herba, & Cytis*; and King ^c *Juba* another, of a sort of *Nymphaea* by him found on Mount *Atlas*. And in our Times, not to mention those many Books that have been written by Physicians, of the Structure of Mans Body, and *De Ufu partium*: *Carolus Rosenbergius* writ some Years since an entire Book of *Roses*, which he calls his *Rhodologia*: *Martinus Blochwitzius* since published another Book of *Elder*, under the Title of *Anatomia Sambuci*. Among the Chymists, *Angelus Sala* publisht in distinct Treatises, his *Vitriologia*, *Tartarologia*, *Saccharologia*. *Untzerus* also writ peculiar Tracts, *De Mercurio*, *De Sulphure*, *De Sale*. And *Paracelsus* himself vouchsafed distinct Treatises to *Hypericon*, *Persicaria*, *Helleborus*, and some other particular Plants. *Basilius Valentinus* (one of the most Knowing and Candid Chymical Writers) publisht long since an excellent Treatise of *Antimony*, inscrib'd *Currus Triumphalis Antimonii*; but though in his other he hath also taught us divers other things concerning it, yet he left so much undiscover'd in *Antimony*, that *Angelus Sala* was thereby emboldn'd to publish his *Anatomia Antimonii*. And *Hamerus Poppius* (if that be his true name) *Fo-hannis Tholdius*, and the experienced *Alexander Van Suchten*, thought fit to write entire Treatises of that same Mineral; by which if they seem to Eclipse the diligence of *Basilius*, at least they bore witness to his Judgement: for modestly inviting his Readers to make further enquiries into the Nature and Preparations of that abstruse Mineral, He gives this account of his leaving many things unmention'd, *That the shortness of Life makes it impossible for one man thoroughly to learn Antimony, in which every day something of new is discovered*. And I remember, that having lately given a Chymist, upon his request, some Directions for drawing, not an imaginary Mer-

Of divers single subjects that require large treatises to unfold them.

a Plin. lib. 25;

b Id lib. 18.

cap. 26.

c Id. lib. 25;

cap. 7;

How many treatises are already made of Antimony, which yet has not been perfectly discover'd.

cury :

Of a real Mer-
cury of Antimo-
ny.

cury of Antimony, as those which are wont to be taught by Chymists, but a real fluid Quick-silver; he some days since brought me about an Ounce of it (which you may command when you please) as the first Fruits of Directions, differing enough from those which I have hitherto met with in Authors. A peculiar way likewise of separating from Antimony, not such a Substance as those which are as improperly as vulgarly call'd Antimonial Sulphurs, but a really combustible Body, which looks and burns so like common Brimstone, that it is not easily distinguishable from it, we shall elsewhere, God willing, *Pyrophilus*, teach you. And I remember, that whereas according to the way mentioned by *Basilius* in his *Curus Triumphalis*, and both generally transcrib'd by Authors, and formerly practis'd by our selves, the Tincture of the Glass of Antimony is very tedious to make, being to be drawn with Spirit of Vinegar, I once made a *Menstruum* to draw it more expeditiously, which having not hitherto met with in any of the Authors I have read, I shall not conceal from you: Taking then an arbitrary quantity of the best French Verdegree, and distilling it orderly in a strong naked Fire, I found the extorted Liquor to extract (even in an ordinary digesting heat) from powdered Antimonial Glass, a Blood-red Tincture in three or four hours; and my curiosity leading me to abstract the *Menstruum* from the tinging Powder, and put it again upon pulveris'd Glass, I found it again highly Tincted in a very few houres. And prosecuting the experiment, I found that by drawing off the *Menstruum*, and digesting Spirit of Wine upon the remain'g Calx, I could soon obtain a red Tincture, or Solution, From which some Chymists, If I should tell them what I have now told you, would perhaps expect no ordinary Medicine. But this, I suppose, you will think less strange, then that with a Liquor easily separated, by a way which I may elsewhere teach you, from an obvious Vegetable, of which you may safely eat a whole Pound at a time; I have drawn a deep red Tincture, even from crude Antimony, and that in not many hours, and without heat.

And

And a real
combustible Sul-
phur of Antimo-
ny that burns
like ordinary
brimstone.

A new Tin-
cture of Antimo-
niall Glass with
the entire pro-
cess to draw it.

And to these Experiments of Antimony, I might (partly from the communication of my Friends, and partly from some tryals of my own) adde divers other undivulg'd Experiments relating to that Mineral; if it were not now more seasonable, reserving them for other Papers, to minde you, That the Learned *Kercherus* hath enrich'd us with a great Volume *in Folio*, of Light and Shadows; and another *in Quarto*, of the Load-stone: and yet none of these have so exhausted the Subjects they have treated of, but that an after-Enquirer may be able to recruit their Observations with many new ones, perhaps more numerous or more considerable then the former: As after our Learned Country-man *Gilbertus* had written a Volume of the Load-stone, the Jesuit *Cabeus* was not by that deterr'd from writing another of the same Subject: And though since *Cabeus*, the Ingenious *Kircherus* have so largely prosecuted it in his Voluminous *Ars Magnetica*, yet he has not reap'd his Field so clean, but that a careful Gleaner may still finde Ears enough to make some Sheaves. And what I have lately try'd or seen, makes me think it very possible to recruit those many of *Kircherus*, with some further Magnetical Experiments unmention'd in his Book. And I have, the very day I writ this, made in that admirable Stone a not-inconsiderable Experiment, not extant (that I remember) there: For taking an oblong Load-stone, and heating it red-hot, I found the attractive Facultie in not many minutes, either altogether abolish'd, or at least so impaired and weakned, that I was scarce, if at all, able to discern it. But this hath been observed, though not so faithfully related, by more then one; wherefore I shall adde, That by refrigerating this red-hot Load-stone either North or South, I found that I could give its Extreame a Polarity (if I may so speak) which they would readily display upon an excited Needle freely plac'd in *Aequilibrium*: And not onely so, but I could by refrigerating the same end sometime North and sometime South, in a very short time change the Poles of the Load-stone at pleasure, making that which was a quarter of

Of Gilbertus, Cabeus, and Kircher who successively wrote the Experiments of the Load-stone;

Of some new Experiments hitherto undescor'd of that Stone.

an

an hour before the North-pole, become the South; and on the contrary, the formerly Southern Pole become the Northern: And this change was wrought on the Load-stone, not onely by cooling it directly North and South, but by cooling in perpendicularly; that end of it which was contiguous to the Ground, growing the Northern Pole, and so (according to the Laws Magnetical) drawing to it the South end of the Needle; and that which was remotest from it, the contrary one: As if indeed the Terrestrial Globe, were, as some Magnetic Philosophers have suppos'd it, but a Great *Magnes*, since its Effluviūms are able, in some Cases, to impart a Magnetic Faculty to the Load-stone it self. Some other Experiments of this nature, not extant in *Kircherus*, we may have elsewhere fit opportunity to mention. And indeed, that Enigmatical Mineral (if I may so call it) the Load-stone, is a subject so fertile in Rarities, that I hear, he himself is Re-printing that accurate Treatise, with new and large Additions.

That admirable Speculations may arise from the most despicable productions of Nature.

Nor are the smallest and most despicable productions of Nature so barren, but that they are capable both to invite our Speculations, and to recompense them. *Pliny* in the eleventh Book of his Natural History, where he treats of Insects, is a little after the entrance, transported with an unwonted admiration of the Workmanship of Nature in them: *Nusquam alibi* (says he) *spectatiore Naturæ rerum artificio: In Nothing elsewhere* (saith he) *is the workmanship of Nature more remarkable then in the contexture of these little Creatures.* And after a Wonder, not unworthy a Philosopher, he concludes, *Rerum Natura nusquam magis quam in minimis tota est: Nature in her whole Power is never more wholly seen then in her smallest Works.* To which *Epiphonema* he adds this Sober and Philosophical Admonition, *Quapropter, quæso ne hac legentes, quoniam ex his spernunt multa, etiam relata fastidio damnent, cum in contemplatione Naturæ nihil possit videri supervacaneum: Wherefore I would request the Perusers of these Discourses, that al-*
though

though the Subjects we treat of are contemptible in their eyes, they would not therefore disdain the relations we shall make of them; since nothing ought to seem superfluous in the contemplation of Nature. I remember that it is from the consideration of so despicable a part as the skin of the Sole of the Foot, that *Galen* takes occasion to magnifie the Wisdom of God in those excellent terms that we shall have occasion to mention hereafter. And, as he says rarely well, though some Creatures seem made of much courser Stuff than others, yet even in the vilest the Makers Art Shines through the despicableness of the Matter. For Idiots admire in things the Beauty of their Materials, but Artists that of the Workmanship: to which, after a great deal of Philosophicall Discourse, he adds, *Neque oculo nec cerebro deterius est pes constructus, si utraque pars ad actiones, cujus gratia fuit facta, se habeat optimè; neque cerebrum sine pede se probe haberet, neque pes sine cerebro: Eget enim, opinor, illud vehiculo, hic autem sensu: Nor is the Foot worse contriv'd than the Brain or Eye, provided each part be duly dispos'd for the performance of the actions to which it was design'd: Since the Brain could not conveniently want the Foot, nor the Foot the Brain. For, I conceive, that one stands in need of a support for local motion, and the other of a source from whence to derive the faculties of Feeling. To which we may annex that Judicious reasoning of *Aristotle*, who descending from the contemplation of the sublimer Works of Nature, to treat of the Parts of Animals, thus endeavors to keep his Readers from thinking that the Object of it must render that Enquiry despicable: *Restat* (says he) *ut de animanti Natura differamus*: And having set down those Words which you have not long since read in connection to these, he thus prosecutes his discourse: *Quamobrem, viliorum animalium disputationem per pensionemque fastidio quodam iuveniliter sprevisse, molestique tulisse dignum nequaquam est: Cum nulla res sit Natura, in qua non mirandum aliquod habeatur. Et quod Heraclitum ferunt dixisse ad eos, qui cum alloqui cum vellent, quod forte in Caeo furnaria quadam caloris gratia sedentem vidissent, accedere temperarunt, ingredi enim**

mirers, the Angels were Created the First Day, as Divines generally infer from the Words of God in *Job*; *Where wast thou when I laid the Foundations of the Earth?* and a little after: *When the Morning Stars sang together, and all the Sons of God shouted for Joy.* Where by the *Morning Stars* and *Sons of God* are suppos'd to be meant the newly Created Angels; one of whose earliest exercises was, it seems, to applaud the Creation, and take thence occasion to sing Hymnes to the Almighty Author of it. I should not, *Pyrophilus*, adde any thing further on this subject, but that having since the writing of these thoughts met with a Discourse of *Seneca's*, very consonant to some of them, I suppose it may tend to your delight as well as to their advantage, if I present you some of the Truths you have seen in my courser Language, dress'd up in his finer and happier Expressions. *Curiosum nobis* (saith he) *natura ingenium dedit, & artis sibi pulchritudinisq; conscia, spectatores nos tantis rerum spectaculis genuit, perditura fructum sui, si tam magna, tam clara tam subtiliter ducta, tam nitida & non uno genere formosa solitudini ostenderet; Ut scias illam spectare voluisse, non tantum aspici, vide quem locum nobis dedit; nec exire tantummodo hominem, sed etiam ad contemplationem factum, ut ab ortu sidera in occasum labentia prosequi posset & vultum suum circumferre cum toto, Sublime illi fecit caput, & collo flexibili imposuit. Deinde sena per diem, sena per noctem signa produxit; nullam non partem sui explicuit, ut per hac qua obtulerat ejus oculis cupiditatem faceret etiam ceterorum: nec enim omnia nec tanta visimus quanta sunt, sed acies nostra aperit sibi investigando viam, & fundamenta veri jact, ut inquisitio transeat ex apertis in obscura, & aliquod ipso Mundo inveniat Antiquius.* And least you might be offended at his mentioning of Nature, and silence of God, give me leave to inform you, that about the close of the Chapter immediately preceding that, whence the Passage you come from Reading is transcrib'd, having spoken of the Enquiries of Philosophers into the Nature of the Universe, he adds, *Hæc qui contemplatur,*

Sen. de Otio
Sap. 32.

that great Variety of Man's Productions, that is to be found in the shops of Artificers, the Laboratories of Chymists, and other well-furnished Magazines of Art, he would admire to see what a new world, as it were, or set of Things has been added to the Primitive Creatures by the Industry of His Posterity.

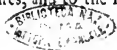
And though it be very true, that man is but the Minister of Nature, and can but duely apply Agents to Patients (The rest of the Work being done by the applied Bodies themselves) yet by his skill in making those Applications, he is able to perform such things as do not only give him a Power to Master Creatures otherwise much stronger then himselfe; but may ennoble one man to do such wonders, as another man shall think he cannot sufficiently admire. As the poor Indians lookt upon the Spaniards as more then Men, because the knowledg they had of the Properties of Nitre, Sulphur and Charcoale duely mixt, enabled them to Thunder and Lighten so fatally, when they pleased. And this Empire of Man, as a Naturalist, over the Creatures may perchance be to a Philosophical Soul preserved by reason untainted with Vulgar Opinions, of a much more satisfactory kind of Power or Sovereignty then that for which ambitious Mortals are wont so bloodily to contend. For oftentimes this Latter being commonly but the Gift of Nature or Present of Fortune and but too often the Acquist of Crimes, does no more argue any true worth or noble superiority in the possessor of it, then it argues one Brasse Counter to be of a better Mettal then its Fellows, in that it is chosen out to stand in the Account for many Thousand Pounds more then any of them. Whereas the Dominion that Phyllogie gives the Prosperous Studier of it (besides that it is wont to be innocently acquired, by being the Effect of his knowledge) is a Power that becomes Man as Man. And to an ingenious spirit, the Wonders he performs bring perchance a higher satisfaction, as they are Proofes of his Knowledge, then as they are Productions of his Power, or even bring Accessions to his Store.



ESSAY II.

O F T H E S A M E.

THe next Advantage, *Pyrophilus*, that we mention'd <sup>That the know-
ledge of Nature
excites and cher-
ishes devotion.</sup> the Knowledge of Nature to bring to the Minds of Men, is, That it therein excites and cherishes Devotion; Which when I say, *Pyroph.* I forget not that there are severall Divines (and some of them Eminent ones) that out of a Holy Jealousie (as they think) for Religion, labour to deterre men from addicting themselves to serious and thorough Enquiries into Nature, as from a Study unsafe for a Christian, and likely to end in Atheisme, by making it possible for Men (that I may propose to you their Objection as much to its Advantage as I can) to give themselves such an Account of all the Wonders of Nature, by the single Knowledge of Second Cauies, as may bring them to disbelieve the Necessitie of a First. And certainly, *Pyrophilus*, if this Apprehension were well grounded, I should think the threatened Evill so considerable, that instead of inviting you to the Study of Naturall Philosophy, I should very earnestly Labour to dissuade you from it. For I, that had much rather have Men not Philosophers then not Christians, should be better content to see you ignore the Mysteries of Nature then deny the Author of it. But though the Zeal of their Intentions keep Me from harbouring any unfavourable Opinion of the Persons of these Men, yet the Prejudice that might redound from their Doctrine (if generally received) both to the Glory of God from the Creatures, and to the Empire of Man.



enim eos fidenter jussit; Quoniam, inquit, ne huic quidem loco Dii desunt immortales; Hoc idem in indaganda quoque natura animantium faciendum est. Aggredi enim quaque sine ullo pudore debemus; cum in omnibus Natura numen, & honestum pulchrumque insit Ingenium: Wherefore it is altogether unseemly to reject with a kind of Childish nicitie, or be offended at the Discourse and Speculation of inferior Animals; Since there is nothing in all Nature, but contains in it somewhat worthy of Admiration. And as it is recorded of Heraclitus, that seeing some persons desirous to speak with him, refuse to approach towards him, because they beheld him warming himself in a miserable Cottage, he bad them come in without scruple, since here also (said he) are the Immortall Gods present: So in like manner ought we to be highly perswaded of the Dignity of Animals, when we make Enquiries into their Natures. Which we ought in no wise to be ashamed of, since the mighty Power and laudable Wisdom of Nature is conspicuous in all things. Nay Paracelsus himself, as haughty as he was, was Philosopher enough not to disdain to write a Book *De Myssertis Vermium*; wherein, though according to His manner he have set down many extravagances, he is more Candid in the Delivery of severall Remedies (which Experience hath recently taught us to be more effectuall then probable) then in most other of his Writings: And in that Treatise he justly reprehends the Laziness and Pride of those Physicians, who not only neglect and scorn Enquiries of Nature themselves: but when the fruits of such Enquiries are presented them by others, instead of a gratefull acceptance, receive them with contempt and derision. To which a while after he adds, what is most true, *That God hath Created nothing so Vile, Despicable, Abject, or Filthy in the World, that may not make for the Health and Use of Man.* And certainly what ever God himselfe has been pleased to think worthy his Making, its Fellow-creature, Man, should not think unworthy of his Knowing. Nor is it a disparagement to a Humane Notion, to represent a Creature, which has the Honour to have been framed according to a Divine Idea: and therefore the Wisest of Men in His

Naturall

what ever God
has thought wor-
thy of knowing,
man should not
think unworthy
of knowing.

Natural History, scruples not to write as well of abject *Reptils*, as of *Lions*, *Eagles*, *Elephants*, and other Noble Animals : and did not only Treat of the tall Cedars of *Lebanon*, but that despicable Plant (what ever it be that is designed by the Hebrew *Ezok*) which grows out of the Wall. For my part, If I durst think my Actions fit to be Examples, I should tell you, that I have been so far from that effeminate squeamishness, that one of the *Philosophical Treatises*, for which I have been gathering Experiments, is of the Nature and Use of Dung. And though my condition does (God be praised) enable me to make Experiments by others Hands ; Yet I have not been so nice as to decline dissecting *Dogs*, *Wolves*, *Fishes*, and even *Rats* and *Mice*, with my own Hands. Nor when I am in my Laboratory do I scruple with them naked to handle Lute and Charcoale.

I should here, *Pyrophilus*, cease to entertain you with Discourses of the pleasantness of Natural Philosophy, but that I remember I have not yet told you, that the study of Physiologie is not only Delightful, as it teaches us to Know Nature, but also as it teaches us in many Cases to Master and Command her. For the true Naturalist (as we shall see hereafter) does not only Know many things, which other men Ignore, but can Performe many things that other men cannot Doe; being enabled by his skill not barely to understand several Wonders of Nature, but also partly to imitate, and partly to multiply and improve them. And how naturally we affect the Exercise of this Power over the creatures may appear in the Delight Children take to do many things (which we may have occasion to mention elsewhere) that seem to proceed from an Innate Propensity to please themselves in imitating or changing the Productions of Nature.

And sure 'tis a great Honour that the Indulgent Creator vouchsafes to Naturalists, that though he gives them not the power to produce one Atome of Matter, yet he allows them the power to introduce so many Formes (which Philosophers teach to be nobler then Matter) and work such changes among the Creatures, that if *Adam* were now alive, and should Survey

*Of the Dominion
and all Power
that Physiologie
gives the possessor
in Studies of
it.*

tion; whilst the three resolute Jewes with their Protectour walk'd unharm'd in the mid'st of those flames that destroy'd ^{2 King. 6. 3, 6.} the Kindlers; and as the heavy Iron emerg'd up to the swimming piece of wood, miraculously by *Elisha* made Magneticall.) And you may also, *Pyrophilus*, take notice, that when *Adam* had transgressed, immediatly the ground was cursed for his sake. And as it is not unusual in Humane Justice to raze the very houses of Regicides and resembling Traitors; So when the provocations of *Sodom* swell'd high enough to reach Heaven, God did not only Destroy the Inhabitants from the Face of the Earth, but for the Inhabitants Sins destroy'd the very Face of the Earth. So when in *Noah's* time a Deluge of Impiety call'd for a Deluge of Waters, God looking upon the living Creatures as made for the Use of Man, stuck not to Destroy them with him, and for him; but involv'd in his Ruine all those Animals that were not necessary to the perpetuation of the Species, and the Sacrifice due for *Noah's* preservation. And so when (in the Last daies) the Earth shall be replenish'd with those *Scoffers* mention'd by *St Peter*, ^{2 Pet. 3. 3, 5, 6. 7, 8, 10.} who will walk after their own Lusts, and deride the Expectation of God's foretold coming to Judg and Punish the Ungodly, their Impiety shall be as well punish't as silenc't by the unexpected Flames (perhaps hastned by that very impiety) that shall either Destroy or Transfigure the World. For as by the Law of *Moses*, the Leprous Garment which could not be recover'd by being washt in Water, was to be burnt in the Fire, so the World which the Deluge could not Cleanse, a general Conflagration must Destroy.

Nor is reason it selfe backward to countenance what we teach. For it is no great presumption to conceive, that the rest of the Creatures were made for Man, since He alone of the Visible World is able to enjoy, use, and relish many of the other Creatures, and to discern the Omniscience, Almightyesse and Goodnesse of their Author in them, and returne Him praises for them. 'Tis not for themselves that the

*The same proved
by Reason and
Authority 26,
27, 28.*

Rubies flame, other Jewels sparkle, the Bezar-stone is Antidotall; nor is it for their own advantage that fruitfull Trees spend and exhaust themselves in Annual profusions. The Light which he diffuses through the World is uselesse to the Sun himself, whose inanimate being makes him incapable of delighting in his own splendor; which he receives but to convey it to the Earth, and other by him illuminated Globes: whence probably the Hebrewes call'd him *Shemesh*, which Grammarians derive from the Root *Shemash* signifying in the Chaldean Tongue, *to serve*, or *minister to*; the Sun being the great Minister of Nature, and Servant general of the Universe. And as Animals alone among the Creatures seem to have a proper sense of, and complacency in, their own Beings; So Man alone among Animals is endow'd with Reason, at least such a pitch of it, as by which he can discern God's Creatures to be the Gifts of God, and referre them to their Creator's Glory. This truth I find not only embrac'd by Christians, but assented to even by Jewes and Heathens; Among the Jewes my Learned Acquaintance, *Manasseh Ben Israel*, professedly labours to prove it by Scripture and Tradition (though in some of his Arguments he might appear more a Philosopher, if he would have appear'd lesse a *Rabbi*) and among other passages I remember he alledges that, wherein the Wise man saies (as our Translators English it) *That the Righteous is an everlasting Foundation*, which he renders, *Fusus est columna Mundi*, *The Just man is the Pillar of the World*. And indeed if the Context did not somewhat distavour the Interpretation, the Hebrew words [*tzaddik yesod olam*] would well enough bear the sense assigned them. Congruously whereunto, I remember that when *Noah* (who is call'd in Scripture a Righteous man, and κήρυξ δικαιοσύνης, a *Herald*, or *Proclaimer of Righteousnesse*) offer'd up that noble Sacrifice of all the sorts of clean Beasts and Fowles, as a Thank-offering for the Reprieve of the World, God is said to have *smelled a Savour of Rest*, and to have resolved in his Heart

How the Sun
(*Shemesh*) is the
great Minister
of the Universe.

In Probl. de
Creat.

Prov. 10. 25.
Gen. 6. 9.

1 Pet. 2. 25.

Heart never to Curse the ground for Man's sake, but to continue the vicissitudes of Summer, and Winter, Day, and Night, &c. as long as the Earth shall remain. And among the Philosophers themselves, the Truth we are now manifesting, has not been altogether ignor'd. For though *Seneca* somewhere, more wittily then truly, saies, *Non causa mundo sumus hyemem astatemque referendi; suas ista leges habent, quibus divina exercentur. Nimis nos suspicimus, si digni nobis videmur, propter quos tanta moveantur:* Yet *Lactantius* (not to mention other Authors) tells us that the Stoick generally believed the World to have been made for man. *Vara est* (saies he) *sententia Stoicorum, qui ajunt nostra causa Mundum fuisse constructum. Omnia enim quibus constat, quaque generat ex se Mundus, ad utilitatem hominis accommodata sunt.* And *Seneca* himself speaks elsewhere almost as if he had read and believed the beginning of *Genesis*; *Dii* (saies he) *non per negligentiam nos genuere, quibus tam multa genuerant: Cogitavit enim nos ante Natura quam fecit.*

Gen. 3. 21, 22.

Secundo De
Ira. cap. 27.De Ira Dei
cap. 13.De Benef. cap.
23.

Nor were the Stoicks the only Philosophers to whom the Contemplation of the Universe discover'd this End of it. For to instance now in *Cicero* only; *Quorum igitur causâ* (saies that great Orator) *effectum esse mundum? Eorum scilicet Animantium, qua ratione utuntur: Hi sunt Dii & Homines, quibus profecto nihil est melius.*

Secundo De
Nat. Deor.

Having thus premised, *Pyrophilus*, that two of God's principal aimes in the Creation, were the manifestation of his own Glorious Attributes, and the Welfare of his noblest Visible Creature, man; It will not be perhaps difficult for You to discern, that those who labour to deterre men from sedulous Enquiries into Nature, do, (though I grant, designelessly) take a course which tends to defeat God of both those mention'd Ends.

For to speak first to the Last of them; that man's external fruition of the Creatures, and the Delight and Accommodation which they may afford him, must be highly prejudic'd

That accommodation and delight which the Creatures might afford Man, is much impaired by the want of Natural Philosophy.

and impair'd by his ignorance of that Natural Philosophy; wherein his Dominion over the Creatures chiefly consists, what we shall say hereafter concerning the usefulness of the Knowledge of Nature to humane Life, will sufficiently evince. But such an Animal fruition (if I may so call it) of the Works of Nature, affords not Man all the good that God design'd him in them. For Religion-being not only the great Duty of Man, but the grand Instrument of his future Happiness, which consists in an Union with and Fruition of God, during that endless Term that shall succeed the expiration of his transitory Life on Earth; what ever increases or cherishes his Religion deserves to be lookt on as a great contributor to his Happiness. And we may therefore venture to affirm that the knowledge of the Creatures does less advantage Man, as it enables him to Master them; then as it Assists him, by admiring and serving him, to become Acceptable to their Author. And what ever our distrustful Adversaries are pleas'd to surmise to the contrary, certainly God intended that his Creatures should afford not only Necessaries, and Accommodations to our Animal part, but Instructions to our Intellectual. The World is wont to be stil'd not unfitly by Divines, *The Christians Inne*; but perchance it may be altogether as properly call'd *his Ship*: for whereas both Appellations suppose him a Traveller, the Inne, though it refresh him in his Journey, does not further him in it, but rather retard his progress by detaining him in one place; whereas a Ship not only serves the Passenger for an Inne when he is weary, but helps to convey him towards his Journey's End. And according to this Notion, to suppose that God hath placed in the World innumerable things to feed Man, and delight him, and none to instruct him, were a conceit little lesse injurious to God, then it were to a wise Merchant, that sends Persons, he loves, to a farre Country, to think that he would furnish their Cabinets with plenty of Provisions, soft Beds, fine Pictures, and all other accommodations for their Voyage, but send them to

Sea

That the instructions to our intellectual part are more considerable then the accommodations we have from Nature to our Animal part.

Sea disprovided of *Sea-Charts* and Mariners Compasses, and other requisite helps to steer their Course by; to the desired Harbour.

And indeed so farre is God from being unwilling, that we should Prye into his Works, that, by divers Dispensations he imposes on us little lesse then a necessity of studying them.

For first he begins the Book of Scripture with the Description of the Book of Nature; of which he not only gives us a general account, to informe us that he made the World; since

*Of the Hints of
Natural Philo-
sophy in the Hi-
story of the Crea-
tion and other
references to it
in other places:
30:31.*

for that end the very first Verse in the Bible might have suffic'd: But he vouchsafes us by retaile the Narrative of each

Day's Proceedings, and in the two first Chapters of *Genesis*, is pleas'd to give nobler hints of Natural Philosophy, then

men are yet perhaps aware of. Though that in most other places of the Scripture, where the Works of Nature are men-

tioned but incidently, or in order to other purposes, they are spoken of rather in a Popular then Accurate manner, I dare

not peremptorily deny, being unwilling to interesse the reputation of Holy Writ (design'd to teach us rather Divinity then Philosophy) in the doubtful contentions of Naturalists,

about such matters as may (though the History of the Creation cannot) be known by the meer Light of Natural Reason.

We may next observe, that God has made some knowledg of his Created Book, both conducive to the beliefe, and necessary to the Understanding, of his Written one: Our Savi-

our making it one cause of the Sadduces great Error about the Resurrection, that they *knew not the Power of God*. And the

Scripture being so full of Allusions to, and comparisons borrowed from the properties of the Creatures, that there are many Texts not clearly Intelligible without some knowledg

of them; as may appear even by the first Gospel (The Promise that the Seed of the Woman should Bruise the Serpents Head, and have his Heele bruised by that subtle Creature) preached to fallen Man in Paradise; and by the representation of the Worlds Four great Monarchies, and the *Genius* of each

of them under, the Notion of Four Beasts, in *Daniel's* prophetick Vision: and that often repeated Precept of our great Master to his Disciples, is coucht in an expreffion alluding to the properties of Animals: For where he commands them to be Wise as Serpents, and Harmlesse as Doves, he does not only recommend to them a Serpentine warinesse in declining dangers, but seems also to prescribe not alone an inoffensiveness towards others (the conspicuousness of which quality in Pigeons have made them, though erroneously, be supposed to have no Gall) But also as harmlesse a way of escaping the dangers they are actually ingaged in, as that of Doves, who being pursued by Birds of Prey, endeavour to save themselves not by fight but, only by flight.

And indeed so many of the Texts in Scripture are not to be competently illustrated, without some knowledge of the properties of the Creatures related to in them, that I wonder not, that *Levinus Lemnius*, *Frantzins*, *Rucius*, and other Learned Men have thought it requisite to publish entire Treatises, some of the Animals, others of the Stones, and others of the other Works of Nature mentioned in Scripture: Only I could wish that they had been as wary in their Writings, as commendable for their Intentions, and had not sometimes admitted doubtfull or fabulous accounts into Comments upon that Book, whose Prerogative it is to teach nothing but Truth.

Nor ought their Labors to deterre others from cultivating the same Theme; For as (such is Gods condescension to Humane weaknesse) most of the Texts, to whose Exposition Physiologie is necessary, may be explicated by the knowledge of the external; or at least more easily observed qualities of the Creatures; So, that there are divers not to be fully understood without the Assistance, of more penetrating indagations of the Abstrusities of Nature and the more unobvious properties of things, an Intelligent and Philosophical peruser will readily discern.

Now

Now if you should put me upon telling you, *Pyrophilus*, what those Attributes of God are, which I so often mention to be visibly display'd in the Fabrick of the World, I can readily answer you, that though many of Gods Attributes are legible in his Creatures, yet those that are most conspicuous there, are his Power, his Wisdom, and his Goodness, in which the World; as well as the Bible, though in a differing, and in some points a darker way, is designed to instruct us, which that you may not think to be affirm'd *gratis*, we must insist a while on each of the Three.

And first, How boundlesse a power, or rather what an Almightyneffe is eminently displayed in Gods making out of Nothing all Things, and without Materials or Instruments constructing this Immense Fabrick of the World, whose Vastness is such, that even what may be prov'd of it, can scarcely be conceiv'd and after a Mathematical Demonstration, its Greatness is distrust'd? Which yet, is I confesse, a wonder lesse to be admir'd then the Power expressed by God in so immense a Work, which nevertheless some modern Philosophers (whose opinions I find some Cabalists to countenance) suppose to be not the only Production of Gods Omnipotence. Not to mention *Elephants*, or *Whales*, some of which an Hyperbolist would not scruple to call moving Mountains and Floting Islands, and to passe by those stupendous Hills, and those Seas, where the Light looses it selfe, as Objects which their nearness only represents so Bulky; let us hasten to consider, that whereas the Terrestrial Globe we Men inhabit, contains, besides all those vast Kingdomes the Unions of some of which constituted the Worlds four celebrated Monarchies, those spacious (since detected) American Regions, that have been deservedly stiled *The New World*: And that whereas the Common Account makes the circuit of this Terrestrial Globe to be no lesse the 22600 *Italian* miles, consisting each of 1000 Geometrical Paces (which number the more recent account of the accurate *Cassendus* makes amount

How Gods Power is conspicuous in the Creatures
323334

amount to 26255 Miles of the same measure) whereas, I say; this Globe of Earth and Water seems to us so vast, Astronomers teach us, that it is but a Point in comparison of the Immensity of Heaven; which they not irrationally prove by the Parallaxis (or Circular difference betwixt the place of a Star, suppos'd to be taken by two Observations, the one made at the Centre, and the other on the surface of the Earth) which *Gassendus* confesseth to be undiscernable in the fixt Stars: as if the Terrestrial Globe were so meer a Point, that it were not material, whether a fixt Star be look'd upon from the Centre, or from the surface of the Earth. This may lessen our wonder at the *Ptolomaans*, making the Sun (which seems not half a Foot over) to be above a hundred sixty and six times bigger then the Earth; and distant from it One thousand one hundred sixty and five Semi-Diameters of the Earth, each of which contains, according to the afore-mentioned computation of *Gassendus*, 4177 Miles; and at their supposing the fixt Stars (whose distance the same Author, as a *Ptolomean*, supput's to be 19000 Semi-Diameters of the the Earth) so great, that they conclude each of the fixt or smallest magnitude to be no lesse then 18 time greater then the whole Earth, and each Star of the First or Chief Magnitude to exceed the Terrestrial Globe 108 times. And as for the *Copernicans* (that growing Sext of Astronomers) they, as their *Hypothesis* requires, suppose the vastnesse of the Firmament to be exceedingly greater then the Ancients believed it. For *Philippus Lansbergius*, who ventur'd to assign Distances and Dimensions to the Planets and Fixt Stars (which *Copernicus* forbore to do) supposes as well as his Master, that the Great Orb it self (as the *Copernicans* call that in which they esteem the Earth to move about the Sun) though its Semi-Diameter be suppos'd to be 1500 times as great as that of the Earth, is but as a Point in comparison of the Firmament or Sphere of the Fixt Stars; which he supposes to be distant from the Earth no lesse then 28000 Semi-Diameters of the Great Orb, that is, 42000000 of Semi-Diameters

Gassend. Inst.
Astr. lib. 2. c. 13.

Gassend. lib. 3.
cap. 11.

diameters of the Earth; or according to the former Computation of common Miles 175434000000, which is a Distance vastly exceeding that which the *Ptolomæans* ventur'd to assign, and such as even imagination it self can hardly reach to. I confess indeed, that I am not so well satisfied with the exactness (nor perhaps with the Grounds) of these kind of Computations, by reason of the Difficulty I have met with in making exact Celestial Observations with either Telescopes, or other Instruments, sufficiently witness'd, by the great disparity remarkable betwixt the Computations of the best Artists themselves. But on the other side I am not sure, but that even the *Copernicans* ascribe not too great a distance to some of the Fixt Stars; since (for ought we yet know) those of the sixth Magnitude, and those which our Telescopes discover (though our bare Eyes cannot) are not really less than those of the first Magnitude, but onely appear so by reason of their greater Distance from our Eyes; as some Fixt Stars seem no bigger than *Venus* and *Mercury*, which are much lesser than the Earth. And therefore upon such Considerations, and because the modestest Computation allowes the Firmament to be great enough to make the Earth but a Point in comparison of it; it will be safe enough, as well as just, to conclude with the Psalmist, *Great is the Lord, and greatly to be praised; and his greatness is unsearchable.*

The next Attribute of God that shines forth in his Creatures, is his Wisdom; which to an intelligent Considerer appears very manifestly express'd in the World, whether you contemplate it as an Aggregate or System of all Natural Bodies or consider the Creatures it is made up of, both in their particular and distinct Natures, and in Relation to each other, and the Universe which they constitute. In some of these the Wisdom of God is so conspicuous, and written in such large Characters, that it is legible even to a vulgar Reader: But in many others the Lineaments and Traces of it are so delicate and slender, or so wrapt up and cover'd with Corporeity, that

How Gods wisdom is conspicuous in them.

it requires an attentive and intelligent Peruser. So numberless a multitude, and so great a variety of Birds, Beasts, Fishes, Reptiles, Herbs, Shrubs, Trees, Stones, Metals, Minerals, Stars, &c. and every one of them plentifully furnish'd and endow'd with all the Qualifications requisite to the Attainment of the respective Ends of its Creation, are productions of a Wisdom too limitleffe not to be peculiar to God: To insist on any one of them in particular (besides that it would too much swell this Discourse) might appear injurious to the rest; which do all of them deserve that extensive Exclamation of the Psalmist,

Psalm. 104. 24.

How manifold are thy works, O Lord; in Wisdom hast thou made them all. And therefore I shall content my self to observe in general, That as highly as some Naturalists are pleased to value their own knowledg, it can at best attain but to understand and applaud, not emulate the Productions of God. For as a Novice, when the curioslest Watch the rarest Artist can make, is taken in pieces and set before him, may easily enough discern the Workmanship and Contrivance of it to be excellent; but had he not been shewn it, could never have of himself devised so skilful and rare a piece of Work: So, for instance, an Anatomist, though when by many and dexterous Dissections of humane Bodies, and by the help of Mechanical Principles and Rules (without a competent skill wherein, a Man can scarce be an Accomplish'd and Philosophical Anatomist) he has learn'd the Structure, Use and Harmony of the parts of the Body, he is able to discern that matchlesse Engine to be admirably contriv'd, in order to the exercise of all the Motions and Functions whereto it was design'd: And yet this Artist, had he never contemplated a humane Body, could never have imagin'd or devis'd an Engine of no greater Bulk, any thing near so fitted to perform all that variety of Actions we daily see perform'd either in or by a humane Body. Thus the Circular motion of the Blood, and structure of the Valves of the Heart and Veins (The consideration whereof, as himself told me, first hinted the Circulation to our Famous *Harvey*) though
now

Particular Observations of the structure of humane body.

now Modern Experiments have for the main (the *Modus* seeming not yet so fully explicated) convinc'd us of them, we acknowledge them to be very expedient, and can admire Gods Wisdome in contriving them: Yet those many Learned Anatomists, that have for many succeeding Ages preceded both *D: Harvey*, and *Columbus*, *Casalpinus*, *Padre Paulo*, and *M^r Warner* (for each of these four last are suppos'd by some to have had some notion of the Circulation) by all their diligent contemplation of humane Bodies, never dream'd (for ought appears) of so advantagious an use of the Valves of the Heart, nor that nimble Circular motion of the Blood, of which our modern Circulators think they discern such excellent Use, not to say, Necessity.

And though it be true, that the greater Works of God do as well declare his great Wisdome as his Power, according to that of the Inspired Philosopher; *The Lord by Wisdome hath founded the Earth, by Understanding hath he establish'd the Heavens. By his Knowledge the depths are broken up, and the Clouds drop down the Dew:* Yet does not his Wisdome appear lesse in lesser Creatures; for there is none of them so little, but it would deserve a great deal of our Wonder, did we attentively enough consider it. And as *Apelles* (in the Story) was discover'd by the skilful *Protagoras*, by so neat and slender a Line, that *Protagoras*, by being scarce able to discern it, discern'd it to have been drawn by *Apelles*: So God, in these little Creatures, oftentimes draws traces of Omniscience, too delicate to be liable to be ascrib'd to any other Cause. I have seen Elephants, and admir'd them less then the structure of a dissected Mole, which hath better Eyes then those, that will not see a designation in the dimness of its Eyes (made onely to see the Light, not other Objects by the help of it) and the unwonted posture of its Feet, given it not to run on the Ground, but to dig it self a way under Ground. And, as despicable as their Littleness makes the Vulgar apt to think some Creatures, I must confess my wonder dwells not so much on Natures

Of the Eyes and feet of Moles.

Clocks (if I may so speak) as on her Watches, and is more exercis'd in the coynesse of the sensitive Plant, and the Mag-netical Properties of a small and abject Load-stone, then the bulk of the tallest Oakes, or those vast Rocks, made famous by Shipwracks. I have pass'd the *Alpes*, and have seen as much to admire at in an Ant-hill, and have so much wondred at the Industry of those little Creatures themselves that inhabited it, that I have ceas'd to wonder at their having given a Theme to *Solomon's* Contemplation. Those vast Exotick Animals which the Multitude flocks to see, and which Men give Money to be allow'd to gaze on, have had many of them lesse of my Admiration, then the little Catterpillar, (as Learned Naturalists esteem it) to which we are beholden for Silk. For (not to mention all the Observables crouded by Nature in that little Worm) I thought it very well deserv'd my wonder (when not long since I kept some of them purposely to try Experiments) how this curious Spinster, after he had buryed himself alive in the precious Tomb he had wrought for himself out of his own Bowels, did cast off his former Skin and Legs, and, in shew, his former Nature, appearing for divers dayes but an almost movelesse Magot; till at length, divesting this second Tegument also (in which Nest, Phenix-like, he had been regenerated out of his own Remains) he came forth (if I may so speak) out of this attiring Room under another form, with Wings, Eyes, and Leggs, &c. to act a new part upon the Stage of the World; which (having spent some dayes without feeding (that I could observe) in providing for the propagation of his Species) he forsakes and dies. And I the rather mention the Silk-Worm, because that there have been of late divers subtle Speculators, who would fain perswade us, That Animals do nothing out of Instinct, or, if you please, innate or seminal Impressions; but Spin, build Nests, and perform all the other Actions for which they are admir'd, barely by Imitation of what they have seen done by others of the same Kind. But in the Silk-Worme
(at

of the Silk-
worm.

That it works
by instinct and
not by imitation.

(at least here in *England*) this plausible Opinion will not hold: For the Silk-worms I kept, were not hatch'd but in the Spring, out of Eggs laid some Dayes in the Sun; and the Worms that laid those Eggs, being every one of them dead the Winter before, it was impossible these new Silk-Worms, when they first began to spin their scarce imaginable fine Web, and inclose themselves in Oval Balls of a very Artificial Figure and Texture, should have wrought thus by Imitation; there not having been for many Moneths before, in the place where they were hatch'd (nor perhaps in the whole Country) any Silk-Worms alive which they might imitate. But I must leave these curious Spinsters to their Work, and proceed to tell you, that Seas and Mountains, with the other Hyperboles of Nature (if I may so term them) proclaim indeed Gods Power, but do not perhaps more manifest his Wisdome, then the contrivance of some living Engines, and (if I may so call them) Breathing Atoms, that are so small that they are almost all Workmanship; so that, as before, in the Psalmists Expression we truly said of Gods Greatnesse, *That it was unsearchable*; we may now as truly say of his Wisdome in the Prophets Words, and in the same Text where he represents him as the Creator of the ends of the Earth, *That there is no searching of* ^{1sa. 40. 28;} *his Understanding.*

And if I durst, *Pyrophilus*, make this part of this Essay of a length too disproportionate to the rest, I could easily, as well as willingly, represent to you divers things which might serve to Illustrate the *πλουσιμιὰ καὶ τὸ θεῖον*, ^{Eph. 3. 10;} *manifest Wisdome of God* (as *St Paul* speaks on another occasion) But though I dare not expatiate on this Subject, yet neither dare I altogether conceal from you, that I have sometimes admired to see what scarce imaginable variety of living Engines his Plastick skill (if I may so speak) has been able to produce, (especially in the Waters) without scarce any other resemblance betwixt them, then that they are each of them excellent in its own Kind, and compleatly furnish'd according to the exigency of its

JER. 10. 16.

Gassend. in Vit.
Peireskii, l. b. 4.Of the vastness
of the Elephant
and its dispro-
portion to the
a'gei and such
like Mites.

its Nature. And that which much encreases this Wonder, is the disproportion of those living Engines, wherein the great [Χολζέρ hakkôl] Former of all things (as the Scripture justly calls God) has been pleas'd to display an almost equally skillful Contrivance. Amongst Terrestrial Animals we have the Elephant, of whose stupendious vastness such strange things are related, even by eminent Writers, that I know not well how either to disbelieve them, or give credit to them: And therefore we shall content our selves to mention that which is left on Record by the accurate *Gassendus* in the Life of *Peireskii*; For this matchlesse Gentleman having caus'd an Elephant, in the Year 1631, to be weigh'd in a Scale, purposely provided, he was found to weigh, of the Roman Pounds (consisting of twelve Ounces a piece) very near Five thousand: And yet surely that this Elephant was very far from being one of the largest of that sort of Beasts, he that shall consider the bigness and length of some of their Teeth, as they are commonly call'd, which are to be seen at divers places, both in *England* and elsewhere, and is not resolv'd not to believe the consonant Relations of Eastern Travellers (among whom *Linschoten* tells us there have been some Teeth found to weigh Two hundred pounds a piece, each pound consisting of twenty four Ounces) may be easily perswaded. On the other side let us reflect upon the smallness of some Terrestrial Animals; and not to mention that little white Creature bred in Wax, which *Aristotle* calls *Arges*, and speaks of as suppos'd to be the least of all living Creatures whatsoever: Let us consider those little Mites that are bred in mouldy Cheese; for divers of these scarce amount to the weight of a Grain, and every Pound containing Five thousand seven hundred and sixty Grains; supposing each Mite did weigh a whole Grain, yet that formerly mention'd small Elephant would exceed him near 28800000 time. And yet though a Mite seem but a moving Atome, and unless there be divers together, is not easily discern'd by the unassisted Eye; yet in an excellent Microscope I have, you know, several

several times both seen and shewn to others, even in a gloomy Day, and a disadvantageous Place, not only the Limbs of this little Animal, but the very Hair growing upon his Legs. Now let us but consider how strangely skillful and delicate a Workmanship must be employ'd to contrive into so narrow a compass, the several Parts Internal and External, requisite to make up this little Animal; how many must go to the texture of the Eyes, and other Organs of Sense; how many to the Snout (which he has, not unlike a Hog) and the several parts of it; how many to the Stomach and Guts, and the other Inward Parts addicted to the digestion of Aliment, and exclusion of Excrements; and to be short, how unimaginably subtile must be the Animal Spirits running too and fro in Nerves suitable in such little Legs: And if, as we have observ'd them to multiply by Eggs, the little Creatures be hatch'd in those little Eggs, after the manner of divers other Oviparous Animals, how much smaller then a hatched Mite must be a Mite upon the Animation of its delineated Parts? Since in Hens Eggs we have sometimes seen the Chick manifestly alive, and its Limbs clearly delineated, whilst yet it took up so small a portion of the Egge, that both the White and the Yolk (betwixt which it is generated, and not of the *Chalaza* or *Tredle*, as *Aquapendente* and other Moderns teach) seem'd to be sometimes yet intire, as well as involv'd in their peculiar Membranes. But it is not so conspicuous in gradient Animals (if I may so speak) as in swimming ones; How vastly disproportionate Masses of Matter the wise *Former of all things* can fashion into living Engines. For Whales are much more stupendious Creatures then Elephants: And not to mention what *Hartenius* (*apud Johnsonum*) tells us of twenty sorts of Whales, whereof the eighteenth Species, which he calls *Nordhwal*, is by him related to be Ninety Ells long; but what Ells he means, I know not: Nor to mention those lesse incredible Accounts which are given of the vastnesse of Whales by our English Navigators, who are wont to Fish for them; I shall onely set
down

Jo: Fisher Lyn-
ceus in his Ex-
position of some
Passages of p.
568.
Of the vastness
of the Whale and
its disproportion
to the small
Worm or fishes
lately discovered
in Vinegar.

down what is related by one of the eminentest Modern Lyn-
cean Philosophers, because he speaks as an Eye-witnesse, when
he tells us, That in the Year 1624, there was cast upon a place
near *Santa Severa*, about 30 Miles from *Rome*, a dead Whale
of 91 Palms in length, and 50 in thickness: He adds, That
its Mouth was 16 Palms long, and 10 high; in which, being
opened and kept gaping; a Man on Horse-back might find
competent room; this Mouth being used to harbor a Tongue
of twenty Palms (which may make out fifteen Foot) in length.
The same inquisitive VVriter adds, That four Years before,
near the Island of *Corfica*, not far from the Coast of *Italy*, ano-
ther Whale was cast, One hundred Foot long, which being a Fe-
male, was found to be big with a Cub of thirty Foot long,
1500 pound weight. But that which will let you see, *Pyro-*
philus, the disproportion betwixt these kind of Fishes and
common Elephants, is, that which the same Author adds,
That the Lard onely, or Fat (as he speaks *Carnea pinguedo*) of
this corpulent Creature, weigh'd One hundred and thirty five thou-
sand pound, that is, above Twenty seven times the weight of
the whole Elephant, which was caus'd to be weigh'd by *Pei-*
reskius. And though the Omnipotent Creator be able to
make swimming Creatures of such prodigious bignesse, that
the Ocean it self may seem to be but a proportionate Pond for
such Fishes; yet is the same Omniscent Continuer, as able
to make a swimming Engine more slender then a Cheese mite,
and so little, that a small part of a Grain may out-weigh di-
vers of them. For, *Pyrophilus*, I must here acquaint you
with a strange Observation, which I have been inform'd to
have been some while since made in *Italy* by *Panarola* a Fa-
mous Physitian in *Rome*, who is said, by the help of an ex-
cellent Microscope, to have discern'd in Vinegar small Living
Creatures, which he takes to be Worms. The mention of
so unlikely an Experiment, made me engage some excellent
Philosophers and Mathematicians to assist me in examining it:
But though our Microscopes exceeded the best that were
brought

brought us over from *Rome*, yet all our diligence and attention did but make them conclude that *Panarola's* Eyes had been deluded. Notwithstanding which, causing a somewhat hollow bottome of pure Chrystalline Glasse to be fitted to my Microscope, I prosecuted the Enquiry my self; and at length was so lucky, as not only to discover these little Creatures with a Microscope, but by holding the Liquor in a Chrystal Viol, almost upon the strong Flame of a Candle, to discover multitudes of them with my naked Eyes, as weak as they are. But though I have already convinc'd those that formerly derided such Observations, as not to be made with the best Microscope, yet the great weaknesse of my Sight has not permitted me to perfect my Observations concerning these Creatures. And therefore reserving the more particular mention of this odde Observation till another time, I shall now only tell you as much as is pertinent to our present purpose; namely, That having with a certain parcel of strong White-wine Vinegar (for 'tis not in every Vinegar that they are constantly to be found) fill'd up to the top thin Viols with long and slender Necks; and having likewise with the same Liquor fill'd other small Crystalline Viols, though short-neck'd, and held them betwixt my Eye and the Sun, or a Window open towards it, or very near a great Candle, I have often in these Glasses, especially in their slender Necks, after having a while fix'd my Eye on them (attention being in this case very necessary) admirably observ'd great numbers (and sometimes as it were Shoals) of living Creatures, which seem'd to be rather Fishes than Worms; for they swim freely up and down the Liquor, and often hover about the top of it, with a wrigling motion, like that of Eels, to which likewise their long and slender shape resembles them. And though these swimming Creatures be not all exactly of a size, yet some of them seem'd slenderer then any sort of living ones, that hath hitherto been taken notice of by the unassisted Eye: And I remember, that having look'd in a good Microscope upon one of them, and a Cheese-

G

mite

Psal. 86. 8.

mite much about the same time, the Fish appear'd so slender, that we judg'd it not much thicker then one of the Legs of the Mite: So that considering what a vast deal of matter the great Creator can manage and fashion into a Whale, and in how little room he can contrive all the parts requisite to constitute a Fish, we may justly say to him in the Psalmists Language. *There is none like unto thee (O Lord) neither are there any works like unto thy works.*

How Gods
Goodness is
conspicuous in
his Creatures by
his provision of
accommodations
for them all; but
especially for his
favourite Man.

Nehem. 9. 6.

The last of the three Properties of God, which we mentioned him to have manifested in the Creation, is his Goodness; Of which all his Creatures do in their due measure partake; partly by their having a being vouchsafed them, and partly by their being preserved in it as long as their subordination to higher purposes, and to more powerful creatures do permit, by that supporting Influence of God which keeps them from relapsing into their first Nothing; according to that memorable Passage, where *Nehemiah* having mentioned God as the *Creator of the Heavens, the Earth, the Seas, and all the Creatures belonging to them.* He calls Him the Preserver, or (as the Originall has it) *The sustainer of them all.* And as for Animals, who are more capable of enjoying, though not most of them of discerning His Bounty, His Goodness to them is more conspicuous. For besides that in Scripture he is called *The Preserver both of Man and Beast,* and accordingly is said to *give food even to the young Ravens that cry,* and to have after the *Flood* remembred not only *Noah,* but *every living thing that was with him in the Ark,* His Goodness to them is apparent by the plentifull and easily attainable provision he makes according to the exigence of their several Natures. For that innumerable swarm of various Birds, Beasts, Fishes, Reptiles, and other Animals that People the Terrestrial Globe, and the contiguous parts of the World, and by his endowing each of them, with all the Qualifications requisite to the perpetuation of their Species, and the preservation of their Lives, as far forth as is consistent with his Ends

Gen. 1. 1.

in

in their Creation: But most resplendent does the Goodness of God appear towards his Favourite Creature, Man, whom having vouchsaf'd to ennoble with his own Image, he makes most of the Creatures of the world visible to us, pay homage to him, and in some manner or degree do him service: God's liberality at once bestowing on him all those Creatures by endowing him, with a Reason enabling him to make use of them; so that even those Creatures which he is not able to subdue by Power, he is able to make serviceable to him by his Knowledge; as those vast Globes of Light, which are so farre above him, that their Immensity and Brightnesse can scarce render them visible to him, are by man's Mathematicks forced to give him an account of all their Motions, and waiting upon his Dials keep time for him; and even the defects of such works of Nature, are by man's skill made serviceable to him, as the Eclipses of the moon serve Geographers notably in that difficult and useful work of finding Longitudes. The Stars serve for Candles to give man light, and the celestial Orbs are his Candlesticks. He breaths the Air, the Fire warms him, and serves him not only in his kitchen, but to master most other Bodies in his furnaces. The Clouds water his Land, the Earth supports him and his Buildings, the Sea and Winds convey him and his Floating houses to the remotest parts of the World, and enable him to possesse every where almost all that Nature or Art has provided for him any where. The Earth produces him an innumerable multitude of Beasts to feed, cloath, and carry him; of Flowers and Jewels to delight and adorn him; of Fruits, to sustaine and refresh him; of stones and Timber, to lodge him, of Simples, to cure him; and in summe, the whole sublunary World is but his Magazine. And it seems the grand businesse of restless Nature so to constitute and manage his Productions, as to furnish him with Necessaries, Accommodations, and Pleasures.

Of such a Number of Plants, Animals, Metals, Minerals, &c. that people and enrich the Terrestrial Globe, perhaps there is not any one, of which Man might not make an excellent use, had he but an insight into its Nature: nor are the most abject and despicable therefore the least useful. There is not any Stone, no not the sparkling Diamond it self, to whom Man is so much beholden, as he is to the dark and unpromising Load stone; without which the New World probably had never been detected, and many Regions of the Old World would have little or no commerce with each other. Nor have the *Lion*, the *Eagle*, and the *Whale*, joyned all together (though reputed the Chief of Birds, Beasts, and Fishes) been so serviceable to Man, as that despicable Insect, *The Silkworm*. And if we impartially consider the Lucriferousness (if I may speak in my Lord of St. Albans Style, of the properties of Things, and their Medical Virtues, we shall find, That we trample upon many things, for which we should have cause to kneel, and offer God Prayers, if we knew all their Qualities and Uses: But of this subject we may elsewhere purposely treat.

Of the unknown
and new de-
tected Properties
and Virtues of
diverse con-
cretes.

To which I must only adde, *Pyrophilus*, That you will injure Nature, if you suppose, either that all the Concretes, endowed with excellent Properties, have long since been notorious, or that all the Medicinal Virtues of Simples, commonly us'd, are already known; or that all those Concretes are destitute of considerable Properties, to whom none have been yet ascrib'd by eminent Authors. For almost every day either discloses new Creatures, or makes new Discoveries of the usefulness of things; almost each of which hath yet a kind of *Terra incognita*, or undetected part in it: How many new Concretes, rich in Medicinal virtues, does the New World present the Inquisitive Physicians of the Old? *Notatu dignum* says the Ingenious *Piso*, in his newly publish'd *Medicina Brasiliensis*, lib. 1.) *quod eximia tot arbores, frutices, & innumera herbae, figura, foliis & fructibus à veteris orbis Vegetabilibus, paucis*

ex-

exceptis, dissimillima appareant. Idem de avibus, animantibus & piscibusprehenditur, ut & insectis alatis, atque alis destitutis; quæ inaffabili colorum pulchritudine & portentosa multitudine generantur, partim nota nobis. partim incognita. And of the known *American* Simples, How many latent Virtues does experience from time to time discover? And (to mention now no others) the Febrifugal property of that *Peruvian* Tree, called by the Natives *Gannaperide*, whose Bark, call'd commonly *China Febris*, has been at *Rome*, and freshly also at *London*, found so wonderfully effectual against those stubborn Diseases, *Quartain Agues*; and though a Learned Author endeavors to depreciate it, by alleging, That it is wont rather to suspend the Fits, than truly cure the Disease, which after a while will return again; yet, besides that, it may be often very beneficial to a weakned Patient, to have his Fits put off, the Phytitian thereby also gaining Opportunities to employ strengthening and preventing Remedies: Besides this, I say, if you will credit that great Person, Sir *Kenelm Digby*, it is rather the Patients or Doctors fault, than the Medicines, if the Disease return. For having purposely consulted him about this Objection against the Use of the *Cortex Febrifugus*, he solemnly assur'd me, That of betwixt Twenty and Thirty Persons, that he had himself cur'd of *Quartans* by this Remedy, not so many as Two fell into a Relapse.

And now I am upon the more freshly discover'd Virtues of *American* Drugs, I might acquaint you with the admirable Properties, not onely in Diseases; but even in Wounds of a certain Mineral, which (though careful examination of it has not yet taught me to what Species of Stones to reduce it) you cannot but have heard mention'd with wonder, under the name of Sir *Walter Rawleigh's* Stone, which my Father, *unusquisque*, enjoy'd, and did strange things with for many years, and by his Will bequeathed (as the highest Legacy he could leave him) to his dearest Friend, the most Learned and Famous *Bp Usher*, *Primate of Ireland*: But of this Stone, the merit of the sub-

Of the Peruvian Bark commonly call'd the Jesuites Powder, Of the Use of Yacucha fol. rutaceo in the Kings-Evil, and of divers other Concretes observable for their unknown properties.

ject makes me reserve what I have to say, to a Discourse, wherein I may be allowed to say more to it then now I dare: and therefore I shall proceed to tell you, that 'tis not in the Simples of the New World onely, that new Medicinal properties may be discover'd; for even those which daily obtrude themselves upon our careless Eyes, or are trampled under our regardlesse Feet, may possesse Virtues, to which the major part of Botanists are mere Strangers. To which purpose, I remember that I have of ten gather'd a little short-lived and despicable Plant, (namely *Paronychia folio Rutaceo*) with which alone (slightly infused in Beer) I lately knew a young Kinsman of Sir *Kenelm Digby's* in few Days, and without pain, as both Him'self, his Mother, and his Physician assur'd me, cur'd of that stubborn and feldome vanquish'd Disease of the Kings Evil, against which it doth Wonders; and yet having consulted not onely some of the famousst and recentest Herbals, both English and Latine, about this, but also enquired of two or three eminent Herbarists, I could finde neither any such Virtue, nor almost any at all, ascrib'd by Authors to that excellent Plant.

Of the use of diverse noxious concretes and that they contain their own Antidotes.

And whereas Gods bounty to Man in the Creatures, seems a little clouded and streightned by his permitting some Poisonous Plants and Venomous Animals to have a Being in Nature; to that it may be reply'd, First, That many Poisonous Bodies contain their own Antidotes; Insomuch that the diligent *Piso*, who hath had great opportunities to examine the Effects of both, ventures to say, treating of the Poisons and Antidotes to be met with in *Brasil*, *Equidem vix dixis, Venena an Alexiteria plura sint pronata:* and a little lower, *Sic folia, flores, & fructus herbarum Tangaraca & Juquerii, venena Brasiliae facile prima, propriam suam unaquaq, radicem oppositum habet Antidotum:* and a little after, *Barbari viperarum pinguedinem & capita, tum & integra Insecta qua vulnera intulerint, ex arte parata, audacter & felici cum successu venenatis ictibus applicant; adeoq, per ipsos effectus comprobare nituntur in omni veneno contineri suum Antidotum:* And next, that the

the noxiousness of many (and therefore not improbably of all of them) is not so incorrigible, but that by Mans Art and Chymical Preparations, they may be made, not onely innocent and harmlesse, but useful too. This Truth, *Pyrophilus*, Antimony and Quick-silver, and some other noxious Bodies (which Men have learn'd to make Medicinal) have already taught our Modern Physitians; who prescribe, even in their Dispensatories, divers Medicines made out of those churlish Minerals, to which, in the ensuing Discourses, you will find divers others (perhaps not interiour) added. That *Opium* is reckon'd by Physitians among Poisons, I need not tell you; and yet such powerful Remedies may be made with it for many desperate Cases, especially in hot Countries, that the good it may doe, so much exceeds the harm, that Physitians would be sorry there were none of it in the World. The Oyl of Scorpions is not onely Antidotal against their Stings, but is witnessed by experience, to be very useful to bring away the descending Stone of the Kidneys and to remedy divers other Mischies, besides those that Scorpions can doe. And to these I shall need but to adde one instance more, because of the nobleness of that single one, and that is the Root *Mandiboca*, so common all over the *West Indies*: for Nature is so far from having been a step-mother to Man in making that plant abound so much in those Countries, though in its crude simplicity as the *Helmontians* speak it be confessedly a rank Poison, that she hath scarce in any one Plant been so bountiful to the *Americans*. For by a slight and easie preparation, which we shall hereafter mention, it affords many populous Nations almost all the Bread they eat, and some of them a good part of their Drink; the Root freed by a strong Press from the noxious Juice, and dry'd, affording them that *Cassia* Meal, whereof they make their Bread, which by the taste and colour I could not discern to be other then good. Nor is this the onely use this Poisonous Plant affords them: For the above-commended *Piso* gives us this short, but comprehensive

Cha

*Of that excellent
west Indian root
Mandiboca;*

Character of it; *Ex Mandibocaradice maximo scatente veneno, optimum Alimentum non solum, sed & Antidotum concinnatur.* (lib. 3^o) But concerning the use that may be made of Poisonous Creatures, we elsewhere professedly discourse: And shall therefore now proceed to observe to you here, that I have not yet mention'd to you the instance which most manifests the greatnesse of the Good which God intended Man in the Creatures: For, not content to have provided him all that was requisite either to Support or Accommodate him here, he hath been pleas'd to contrive the World so, that (if Man be not wanting to himself) it may afford him not onely Necessaries and Delights, but Instructions to; For each Page in the great Volume of Nature is full of real Hieroglyphicks, where (by an inverted way of Expression) Things stand for Words, and their Qualities for Letters. The Psalmist observes, *That the Heavens declare the glory of God:* And indeed, they celebrate his Praises, though with a soundless Voice, yet with so loud a one (and which gives us the Moral of *Plato's* exploded notion of the Musick of the Spheres) to our intellectual Ears, that he scruples not to affirm, that *There is no Speech nor Language where their voice is not heard* (or as *Junius* and *Tremellius* render it, without violence to the Hebrew Text, *There is no Speech nor Words, yet without these their Voice is understood*) and that their Line is gone throughout all the earth; that is (as the Learned *Diodati* expounds it) their Writing in gross and plain Draughts, and their Words to the end of the World: Their Language having so escap'd the confusion of Tongues, that these Natural and Immortal Preachers give all Nations occasion to say of them, as the Assembly at Pentecost did of the Inspir'd Apostles, *We do hear them speak in our Tongues the wonderful Works of God.*

Nor can we without listening to these Sermons, derive the entire (perhaps not the chiefest) Benefit design'd us in the Creatures: For sure, that God, who hath compos'd us both of Body and Soul, hath not confin'd the uses of so many admirable

How we are by
the Creatures in-
structed to De-
votion.

Psal. 19. 1.

Acts 2. 11.

nable Creatures, and so much inimitable Workmanship to that ignoble part of Man which coupleth him to the Beasts, with the neglect of that Diviner Portion, which allies him to the Angels; vouchsafing to the Lord of the Creatures, in the fruition of this his Palace, no higher Prerogative then he is pleas'd to allow to the Brutes, that serve but to compleat the variety requisite for its embellishment. Of this Opinion I lately found that excellent Writer, *St Austine*, to have been before me: For, *Non debes uti oculis (sayes he) ut pecus, tantum ut videas, quæ addas ventri, non menti: utere, ut homo, intende Calum, & intende Facta, & quare Factorem; aspice quæ vides, & quare quem non vides, crede in eum quem non vides, propter ista quæ vides. Nolite fieri sicut equus & mulus, &c.*

Nor can the Creatures onely inform Man of Gods Being and Attributes (as we have already seen) but also instruct him in his own Duties: For we may say of the World, as *St Augustine* did of the Sacraments, that it is *Verbum visibile*.¹ And certainly, God hath never so confin'd himself to instruct Men by Words or Types, as not to reserve himself the liberty of doing it by things: Witnesse his appointing the Rainbow to Preach his Goodnesse to all Nations, and fortifie the Faith of Mankind against the fear of a second Deluge: 'Tis something too high a saying for an Heathen, that of *Plato*, where he teaches, *That the VWorld is Gods Epistle, written to Mankind*. For by *Solomon* God sends the Sluggard to school to the Ant, to learn a provident Industry: Christ commands his Disciples to learn of *Serpents and Pigeons* prudence and inoffensivenessse: The same Divine Teacher enjoyns his Apostles to consider the *Lillies*, or (as some would have it) the *Tulips of the Field*, and to learn thence that difficult Virtue of a distrustless relyance upon God: And *St Paul* seems almost angry with the *Corinthians*, That their Faith, in so abstruse My-^{1 Cor. 13. 36,} steries as that of the Resurrection, was not inform'd and ^{37.} strengthened, by considering the meliorating death of Corn committed to the Earth: And the Royal Poet learns Humili-

Psalm 8. 3, 4.

ty, by the Contemplation of the most elevated parts of Nature; *When I consider* (says he) *the Heavens, the work of thy Fingers, the Moon and Stars which thou hast ordained, What is Man, that thou visitest him?* Thus you may see that God intended the VWorld should serve Man, not onely for a Palace to live in, and to gaze on, but for a School of Virtue; to which his Philanthropy reserves such inestimable Rewards, that the Creatures can, on no account, be so beneficial to Man, as by promoting his Piety, by a competent degree of which, Gods goodnesse hath made no less then Eternal Felicity attainable.



ESSAY





ESSAY III.

Containing a Continuation of the Former.

HAVING thus, *Pyrophilus*, endeavored to evince, that the Opinion that would deter Men from the scrutiny of Nature, is not a little prejudicial to Mans Interests, and does very much lessen the Advantages he may derive from the Creatures, both in relation to his accommodation in this Life, and his Felicity in the next: Let us proceed to consider, whether the Doctrine we oppose do not likewise tend, in its own nature (though not in the Intentions of its Patrons) to defeat God of much of that Glory which Man both ought and might ascribe to him, both for himself and the rest of the Creatures. How unlikely is it that we should be able to offer to God that Glory, Praise, and Admiration, he both expects and merits from such a contemplation of the Creatures, as though it be requisite to the true knowledge of their Nature and Properties, is yet suppos'd either pernicious, or at least dangerous, You, *Pyrophilus*, or any other impartial Person may easily determine.

That their Opinion who would deter men from the Scrutiny of Nature tends to defeat God of much of that Glory Man should ascribe unto him.

For the Works of God are not like the Tricks of Juglers, or the Pageants that entertain Princes, where concealment is requisite to wonder; but the knowledge of the Works of God proportions our admiration of them, they participating and disclosing so much of the inexhausted Perfections of their Author, that the further we contemplate them, the more Foot-steps and Impressions we discover of the Perfections of their Creator; and our utmost Science can but give us a juster

veneration of his Omniscience. And as when some Country Fellow looks upon a curious Watch, though he may be hugely taken with the rich Enamel of the Case, and perhaps with some pretty Landskip that adorns the Dial-plate; yet will not his Ignorance permit him so advantageous a Notion of the exquisite Makers skill, as that little Engine will forme in some curious Artift, who besides that obvious Workmanship that first entertains the Eye, considers the exactnesse, and knowes the use of every Wheel, takes notice of their proportion, contrivance, and adaptation altogether, and of the hidden Springs that move them all: So in the World, though every Peruser may read the existence of a Deity, and be in his degree affected with what he sees, yet is he utterly unable to descry there those subtler Characters and Flourishes of Omniscience, which true Philosophers are sharp-sighted enough to discern. The existence of God is indeed so legibly written on the Creatures, that (as the Scripture speaks in another sense) *He may run that reads it*; that is, even a perfunctory Beholder, that makes it not his businessse, may perceive it. But that this God has manifested in these Creatures a Power, a Wisdome, and a Goodnesse worthy of himself, needs an attentive and diligent Surveyor to discover. How different notions of Gods Wisdome do the Eggs of Hens produce in the ordinary Eaters of them, and in curious Naturalists, who carefully watch and diligently observe from time to time the admirable progresse of Nature in the Formation of a Chick, from the first change appearing in the *Cicatricula* (or little whitish speck discernable in the Coat of the Eggs Yolk) to the breaking of the Egg-shell by the perfectly hatched Bird, and on Natures exquisite method in the order and fashioning of the parts, make such Philosophical reflections as you may meet with (not to mention what *Aristotle* and *Fabricius ab Aquapendente*, have observed on that subject) in the Ingenious Treatise of Generation, which our accurate and justly Famous Anatomist, Dr *Higmore*, has been pleased to Dedicate to me; and in the excellent Exercises-

tions, *De Ovis*, of that great Promoter of Anatomical Knowledge, Dr *Harvey*. And whereas it may be alledg'd, That the Attributes of God, which are not taught us, but after much speculation of the World, are things of which no Man but an Atheist doubts; to this it may be reply'd, That besides that, it ill becomes the sense we ought to have of our weaknesse to despise any helps vouchsaf'd us of God to assist us to know or serve him; besides this, I say, God loving, as he deserves, to be honor'd in all our Faculties, and consequently to be glorifi'd and acknowledg'd by the acts of Reason, as well as by those of Faith, there must be sure found a great disparity betwixt that general, confus'd, and lazy Idea we commonly have of his Power and Wisdome, and the distinct, rational, and affecting notions of those Attributes which are form'd by an attentive inspection of those Creatures in which they are most legible, and which were made chiefly for that very end. The Queen of *Sheba* had heard in her own Country a very advantageous Fame of the Wisdome of *Solomon*; but when the curiosity of a personal Visit made her an Eye-witnesse of those particular both exquisite Structures, and almost Divinely prudent Conducts and Contrivances wherein that Wisdome did inimitably display it self, she then brake forth into Pathetick and Venerating Exclamations, that acknowledg'd how much juster and improved a Character (of his Wisdome) her Eyes had now given her, then formerly her Eares had done.

Very like a Philosopher, methinks, does the Great *Mercurius Trismegistus* (if we grant him to be the Author of the Books ascribed to him) speak, when he tells his Son, *There can be no Religion more true or just, then to know the things that are, and to acknowledg thanks for all things to him that made them; which thing I shall not cease to do:* (he continues) *Be Pious and Religious, O my Son! for he that does so is the best and highest Philosopher; and without Philosophy it is impossible ever to attain to the height and exactnesse of Piety and Religion.* And 'twas perhaps, *Pyrophilus*, to ingage us to an in-

*Merc. Trism.
i. i. Englished
by Dr. Everard.*

industrious indagation of the Creatures, that God made Man so indigent, and furnish'd him with such a multiplicity of Desires; so that whereas other Creatures are content with those few obvious and easily attainable necessities, that Nature has almost every where provided for them; In Man alone, every sense has store of greedy Appetites, for the most part of Superfluities and Dainties, that to relieve his numerous Wants, or satisfy his more numerous Desires, He might be oblig'd with an inquisitive Industry to Range, Anatomize, and Ransack Nature, and by that concern'd survey come to a more exquisite Admiration of the Omniscient Author. To illustrate this subject yet a little further, *Pyrophilus*, give me leave to observe to you, That Philosophers of almost all Religions have been, by the contemplation of the World, mov'd to consider it under the notion of a Temple: *Ne adoremus* (says *Plutarch*) *Elementa, Cælum, Solem, Lunam, &c. specula sunt hac, in quibus artem illius singularem intueamur, qui mundum condidit, & adornavit; nec est aliud Mundus quam Templum ejus: Let us not venerate the Elements, the Heaven, the Sun, the Moon, &c. these are but Miroirs, wherein we may behold his excellent Art, who fram'd and adorn'd the World; nor is the World anything else but his Temple. Homines* (says *Cicero*) *tuentur illum Globum, quem in Templo hoc medium vides, qui terra dicitur: Men abide upon that Globe which you see in the middle of this Temple, and is called the Earth; which Macrobius handsomely thus expounds: Quicquid humano aspectui subjicitur, Templum ejus vocavit qui solâ mente concipitur, ut qui hac veneratur ut templa, cultum tamen maximum debeat Conditori, sciâtque quisquis in usum Templi hujus inducitur, ritum sibi vivendum sacerdotis: All that humane view reaches, he terms his Temple, who is apprehended by the minde alone; so the end that who so reverences these things as Temples, might render the greatest worship to the Maker; and every one that is brought to converse in this Temple, might know himself oblig'd to live like a Priest.*

That Philosophers of all Religions have considered their world under the Notion of Gods Temple.

And

And the Lofty *Seneca* (to mention now no other Heathens) in divers passages of his excellent Writings, stile the World a Temple; and I remember in his Treatise, *De Beneficiis*, he avers in terms not unworthy his Mind or his Subject, *Totum mundum Deorum esse immortalium Templum, solum quidem amplitudine illorum ac magnificentia dignum.* Sen. lib. 7. cap. 7. That the whole World is the Temple of the immortal Gods, being alone worthy of their Grandeur and Magnificence. The assent of the Jewish Philosophers to this Notion, you may be pleased to receive from their Eloquent *Philo*, who not only gives the World the Name of Temple, but gives us this account of that appellation; *Templum Dei supremum & verè tale existimare totum hunc mundum, qui sacrarum quidem habet, purissimam rerum naturam partem, Cælum; ornamenta, stellas; sacerdotes, administratos potentia ejus, Angelos, & incorporeas animas.* Philo Jud. de Monarchia. The whole World is to be accounted the chiefest Temple of God; the Sanctum Sanctorum of it is the purest part of the Universe, Heaven, the ornaments, the Stars, the Priests, the Ministers of His Power, Angels, and immaterial Souls. And as for Christian Philosophers, I suppose it would be needlesse to enumerate the passages wherein they adapt the Notion of the World already mention'd; and therefore I shall content myself to adde, that the Scripture it self seems to Authorise it by representing to us in the Eighth and Nineth Chapters of the Epistle to the Hebrewes, the Mosaical Tabernacle, as an adumbration of that Great Temple of the World; and particularly there is a signal Text in the latter of those Chapters, where it is said that Christ is not enter'd into Holy places made with Hands Heb. 8. 5, 5; [*χειροποιήτων ἁγίων*] which are copies of the true Heb. 9. 11; [*ἀρχαίου τοῦ ἁγίου ὁμοιωμάτων*] but into Heaven it self, now to appear in the presence of God for us.

Upon what account, *Pyrophilus*, I esteem the World a Temple, I may elsewhere have occasion to Declare; but this for the present: It will not be rash to infer that if the World be a Temple, Man sure must be the Priest, ordain'd (by being qualified

That in this Temple Man must be the Priest.

qualifi'd) to celebrte Divine service not only in it, but for it. For as in Schools, when the Prince or some munificent Benefactor confers some large possession or rich annuity upon the Foundation, though all the Boyes be concern'd in the benefit, yet because most of them are too young to be sensible of it, or too unlearned to be able to make the retribution of a handsome acknowledgment, either the Master or that other person of society, who is most capable and the best spokesman, is by a kind of natural right engag'd to the duty of returning praise and thanks, not for himself alone, but in the name of all the rest: So in the World, where there are so many inanimate and irrational Creatures, that neither understand how much they owe to their Creator, by owing him even themselves, nor are born to a condition enabling them to acknowledge it; Man, as born the Priest of Nature, and as the most oblig'd and most capable member of it, is bound to returne Thanks and Praises to his Maker not only for himselfe but for the whole Creation. In which sense we may reconcile those two current Assertions, *That God made all things for His own Glory, and that God made all things for Man, and Man for himself*: Since whether or no Man be a Microcosme or Little World in *Paracelsus's* sense, if not as a ressembler, yet as a representer of the Macrocosme or Great World, he presents with his own adorations the Homages of all the Creatures to their Creator, though they be ignorant of what is done, as Infants under the Law were of the sacrifices offered on their account. And in this Relation may the Creatures answer the Solemn invitation made them in the whole 148 *Psalm*, and numerous other Scriptures: which they may do (to borrow a barbarous but significant School-terme) objectively, though not formally; I mean, by proving occasions, though not fingers of his praises, and being such objects as prompt and invite Man to pay God that praise upon their score, which they cannot actually pay him themselves; even God's muteſt works being capable of being ſaid

to

to praise him in the same sense (though in an incomparably transcendent degree) that *Solomon* saies of his virtuous Woman (in the last Verse of the Proverbs) *Let her own Works Praise her in the Gates*; that is, give the considerers of them occasion to extol her: and thus by man's referring the knowledge of the Creature to the Creator's Glory, it becomes in some sense, and congruously to its own Nature, the praiser of its Maker, as may seem intimated in this O Economy of the Last part of one of the *Psalmes*, *Blesse the Lord, all ye His Hosts, the Ministers of His that do His pleasure. Blesse the Lord, all His Works, in all places of His Dominion: Blesse the Lord, O my Soule.* Where by shutting up the rest of God's Creatures betwixt Angels and Man's Soul, he seems to insinuate that the irrational Creatures blesse the Lord by the mouth of those that are Intelligent.

And truly, *Pyrophilus*, I fear it may relish a little of selfishnesse, to make such a disparity betwixt Perfections, all of them equal, because all of them infinite, as to let God's mercy, because it most advantages us, so to ingrosse our thoughts, and wonder, as to make us neglect the contemplation of those other Glorious Attributes, his Power and his Wisdome, which were those that exacted both Man and Angels adoration, before sin gave occasion to the exercise of the first. And I shall not scruple to confesse unto you, that I dare not confine the Acts of Devotion to those which most men suppose to comprise the whole exercise of it; not that I at all undervalue, or would depreciate any, even the meanest practises of Devotion, which either Scripture or reason consonant to it recommends; but that I esteem that God may be also acceptably (and perhaps more nobly) serv'd and glorify'd by our entertaining of high, rational, and as much as our nature is capable of worthy notions, attended with a profound and proportionable admiration of those divine Attributes and Prerogatives for whose manifesting he was pleas'd to construct this vast Fabrick,

The contemplation of God's mercy ought not so to ingrosse our thoughts as to make us neglect the Glory of his Power and Wisdome.

To which purpose I consider, that in the Life to come, when we shall questionless glorifie God exactliest, we shall have little either need or use of Faith, Prayer, Liberality, Patience, and resembling Graces; but our Worship will chiefly consist in elevated Notions, and a prostrate Veneration of Gods Omnipotence, Wisdom, Goodness, and other Perfections; and such a one as this is represented in the *Apocalyps*, to be the present employment of the Blest Spirits in Heaven, where the Elders that assist about the Throne of God are describ'd, casting their Crowns before it, and saying to him that sits on it *Thou art worthy, O Lord, to receive Glory, and Honor, and Power: for thou hast created all things, and for thy pleasure they are and were created.*

Rev. 4. 11. By this time, *Pyrophilus*, I hope you begin to think, that the Doctrine that tends to deter Men from enquiring into Nature, is as well derogatory from Gods Glory, as prejudicial to Mans interests. And indeed, I purpos'd to content my self with the having dispers'd throughout the past Discourse, the grounds of answering their Objection against the study of Physiology, who pretend it is apt to make Men Atheists: but because I am much concern'd to have you satisfied of so important a Truth, as that which we have hitherto been laboring to evince, I must beg your leave, *Pyrophilus* to adde *ex abundanti* (as they speak) to what has been already alledg'd, some things that may more directly answer the Objection of our Adversaries, and manifest how little their severity is befriended, either by Scripture, Reason, or Experience.

And first, it seems not at all probable, That if the Omniscient Author of Nature knew that the study of his Works did really tend to make Men dis-believe his Being or Attributes, he would have given Men so many Invitations, and almost Necessities, to study and contemplate the Nature of his Creatures: Of these Invitations divers have been mention'd already, and more might be added to them, if we thought it requisite. But what has been above alledg'd, will make us
forbear

or bear the annexing of any, save that of the ancient Institution of the Sabbath, which many eminent Divines do not groundlessly hold to have been ordain'd to commemorate the Creation, and give Men the opportunity every Seventh Day to contemplate God in his Works, as he himself was pleas'd to rest on the first Seventh Day, and contemplate Himself in the works of the first six. And though our Western Churches, for certain Reasons (not here to be inquir'd into) have long since disus'd the Solemnizing of the Saturday, and appointed the Sunday for the Celebration of both the Works of the Redemption, and Creation of the World together; yet 'tis evident enough that the Primitive Christians did for the most part keep the Saturday as Holy-day, as well as the Sunday: For that ancient Book (whoever be resolv'd to have written it) which goes under the Name of *Clement's Constitutions*, affords us, among others, these two memorable Passages to our purpose: And first, Τὸ Σάββατον μὴν τοῦ (says he) ἡμετέρου τοῦ ἁγίου. *Keep the Sabbath and the Lords Day as Holy-days; that being dedicated to the remembrance of the Creation, and this to that of the Redemption.* To which we shall add this second Passage of the same Author, Ἐργαζέσθωντες ἡμεῖς, &c. *Let Servants work for five days; but on the Sabbath, and the Lords day, let them attend in the Church the Doctrine of Godliness.* To which purpose, I remember the most Learned *Grotius* observes, That the converted Emperor *Constantine*, forbad the compelling Christians to appear before Tribunals on either of those Dayes, as being their Festivals: Nay, and if Modern Travellers do not mis-inform me, I finde that divers of the Eastern Churches, particularly the *Abyssine* Christians, to this day do as well sanctifie the Sabbath-day in commemoration of Gods having created the World. as the Lords-day to commemorate the Resurrection of Christ. And as for the Jews sense of the Fourth Commandment, some of the Learnedst of their Critics are pleas'd to distinguish betwixt the Words *Zachôr and Smôr*.

Prov'd further
from the ancient
Institution of the
Sabbath

Lib. 7. c. 34.

See of the *Abyss.*
fine or *Aethiopi-*
an Christians;
and likewise of
the *Maronites*
in the East, in
reference to
their Celebration
on of the Satur-
day, *Alex. Rossé*
in his view of all
Religions, and
the Authors by
him cited.

Smór, Remember and Keep, imploy'd in the Command of solemnizing the Sabbath: For, the remembring of it they hold to be an act of Religion, performable by all Man-kind that are capable of it, and acquainted with its having been commanded; though the keeping of it Holy they suppose onely enjoyn'd to the *Israelites*: On which occasion, I remember I was one Sabbath-day entertain'd at his own Lodgings, by a Learned Jew (who taught me the Holy Language) with Meat then newly dress'd: to remove my wonder at which, he told me, *That it was dress'd by Christians, who, being Gentiles, were not oblig'd to the strict and legal observation of the Sabbath.* But what ever be to be thought of this Jewish Notion, yet questionlesse if the Fourth Commandment do not, at least, divers other Passages of Scriptures do much discountenance their severity, who would fright Men from the Indagation of Nature. And he that shall duly consider divers Texts obvious enough in the Book of *Job*, and the *Psalms* (besides other parts of the Bible) will not readily conclude, that Natural Philosophy and Divinity are at such variance, as the Divines we deal with would perswade us. *St Paul* seems to inform us, that the invisible things of God from the Creation of the World, are cleerly seen, being understood by the things that are made, even *his Eternal Power and God head*: So that they that were mention'd before are without excuse: And though I ignore not, that not onely several of the *Socinians* following their Master *Socinus*, but some few Orthodox Writers, are pleas'd to give a very differing Interpretation of that Text, and make the ἀόρατα αὐτοῦ ἀπὸ κτίσεως κόσμου, to signifie those things of God that have been Invisible ever since the Creation of the World, and referring the πλάσματα to things not made, as we Translate it, but done (as the Miracles of Christ and his Apostles) yet I see no necessity why the αὐτήματα should be taken in a sense exclusive of the Creation, and not at least admitted to take in all the Wayes and Methods imployed by God to manifest the invisible things there intimated unto Man:

And

Rom. 1. 20.

And certainly, however *St Paul* may be suppos'd to appear but darkly, yet *Job* was clearly of a differing Opinion from theirs, who teach, *That the Study of Nature leads to Atheism*: *For ask now the Beasts* (sayes he) *and they will teach thee, and the Fowls of the Air, and they shall tell thee, or speak to the Earth, and it shall teach thee, and the Fishes of the Sea shall declare unto thee. Who knoweth not in all these that the hand of the Lord hath wrought this?* And consonantly hereunto, which 'twere not amiss for our Adversaries to take notice of; we may observe, That almost all the Writers of Natural Theology, and the most also of those that have labored to demonstrate the Truth of Christian Religion (divers of whom have been as well Profound Divines, as otherwise Eminent Scholars) have undertaken to evince, by the consideration of the Universe, both that there is a God, and that he is the Author of it: Which I the rather mention, *Pyrophilus*, because I would not be mistaken, as if I disputed against Divines in general, or were guilty of the least Irreverence towards a Faculty, in whose Study I have thought myself oblig'd, as a Christian, to spend much of my time; and especially, I would not appear disrespectful to Divines in *England*, where they have already been but too much v. lified, though questionlesse for their Sins against God, yet, I fear, not without the Sin of their Oppressors.

In the next place I consider, That since Physiology is said to tempt to Atheism, but by enabling Men to give an account of all the *Phenomena* of Nature, by the knowledge of Second Causes, without taking in the First, it will not be so easie a matter as many presume, for the contemplation of Nature, to turn a considering Man Atheist. For we are yet, for ought I can find, far enough from being able to explicate all the *Phenomena* of Nature by any Principles whatsoever. And even of the Atomical Philosophers, whose Sect seems to have the most ingeniously attempted it, some of

That Physiologists cannot explicate by second causes all the Phenomena of Nature so as to exclude the first.

the eminentest have themselves freely acknowledged to me, their being unable to do it convincingly to others, or so much as satisfactorily to themselves: And indeed, not onely the Generation of Animals is a Myſtery, which all that Naturaliſts have ſaid to explain it, hath been far enough from depriving of that Name: but we ſee that to explicate, all the various *Phænomena* that belong to that ſingle inanimate, and ſeemingly homogeneous Body, *Mercury*, ſo as not to make any *Hypotheſis* aſſum'd to make out one of its Properties or Effects incongruous to any other *Hypotheſis* requiſite to the explantation of any of the reſt, hath been hitherto found ſo difficult, that if our Poſterity be not much happier Unriddlers, then our Fore-Fathers, or we have been, it is like to prove a Task capable of defeating the Industry and Attempts, I ſay not of more then one Philoſopher, but of more then one Age, even our Chymical Tortures hitherto, having, from that deluding *Proteus*, forc'd no Confeſſions that bring us not more Wonder then Satisfaction, and do not Beget almoſt many Scruples as they Reſolve.



ESSAY





ESSAY IV.

*Containing a requisite Digression concerning
those that would exclude the Deity from
intermeddling with Matter.*

Ignore not that not onely *Leucippus Epicurus*, and other
Atomists of old, but of late some Persons, for the most
part Adorers of *Aristotle's* Writings, have pretended to
be able to explicate the first *Beginning of Things*, and the
Worlds *Phænomena*, without taking in, or acknowledging
any Divine Author of it: And therefore, though we may
elsewhere, by the assistance of that Author, have an oppor-
tunity to give You an Account of our unsatisfiedness with the
Attempts made by some bold Wits in favor of such Pretensi-
ons; Yet since the main Truth We plead for, in this Dis-
course, is so nearly concern'd in what hath been taught by those
that would keep God from being thought to have any share in
the Production of the Universe; I can scarce forbear (as un-
willing as I am to digress) to represent to You, on the present
occasion, a few Considerations which may assist You, if not
to lessen the Arrogance of such Persons, at least, to keep Your
self from thinking their Evidence as great as their Confidence
is wont to be. Now of the Philosophers we speak of, some
being Atomists; and others not, it will be requisite to say
something to each of the two sorts: And because we not long
since, in an Illustrious Company, where You, *Eyrophilus*, are
not unknown, met with one of them, who avowedly ground-
ed his Opinions on the *Aristotelean* or vulgar Physiology, We
shall

*That some of the
Peripatetic self
are guilty of this
endeavour.*

shall first recommend to You two or three Considerations concerning such arrogant Peripateticks (For I speak not of that Sect in general, of which I know there are divers excellent Men.)

That their Hypothesis is very full of Mistakes.

First then, You will in many Passages of the following Essays, find, that divers things that have been very Magisterially taught, and confidently believ'd among the Followers of *Aristotle*, are Errors or Mistakes; and that as several, even of the obvious *Phænomena* of Nature, do contradict the common Peripatetick Doctrine, so divers, at least of those that are more abstruse, are not explicable by it; and as confidently as these his Followers talk of the expounding the very Riddles of Nature; yet I remember that he himself somewhere (for I cannot call to mind the place) did not scruple to confess, that *As the Eyes of Owls are to the splendor of the Day, so are those of our Minds even to things obvious and manifest.*

That these excluders of the Deity make but imperfect explanations of the Phænomena of Nature.

I shall next take notice, That Philosophers, who scorn to ascribe any thing to God, do often deceive themselves, in thinking they have sufficiently satisfied our Enquiries, when they have given us the nearest and most immediate causes of some things; whereas oftentimes the assignment of those Causes is but the manifesting that such and such Effects may be deduc'd from the more Catholick affections of things, though these be not unfrequently as abstruse as the *Phænomena* explicated by them, as having onely their Effects more obvious, not their Nature better understood: As when, for instance, an account is demanded of that strange supposed Sympathy betwixt Quick-silver and Gold; in that we find, that whereas all other Bodies swim upon Quick-silver, it will readily swallow up Gold, and hide it in its Bosome. This pretended Sympathy the Naturalist may explicate, by saying, That Gold being the onely Body heavier then Quick-silver of the same bulk, the known Lawes of the *Hydrostaticks* make it necessary, that Gold should sink in it, and all lighter Bodies swim on it: But though the cause of this Effect be thus plausibly assign'd, by

by deducing it from so known and obvious an affection of Bodies, as Gravity, which every man is apt to think he sufficiently understands; yet will not this put a satisfactorie period to a severe Inquirers Curiosity, who will, perchance, be apt to alledge, That though the Effects of Gravity indeed be very obvious, yet the Cause and Nature of it are as obscure as those of almost any *Phænomenon* it can be brought to explicate. And that therefore he that desires no further account, desists too soon from his Enquiries, and acquiesces long before he comes to his Journeys end. And indeed, the investigation of the true nature and adequate cause of gravity, is a task of that difficulty, that in spite of ought I have hitherto seen or read, I must yet retain great doubts whether they have been clearly and solidly made out by any Man. And sure, *Pyrophilus*, there are divers Effects in Nature, of which, though the immediate Cause may be plausibly assign'd, yet if we further enquire into the Causes of those Causes, and desist not from ascending in the Scale of Causes till we are arriv'd at the top of it, we shall perhaps finde the more Catholick and Primary causes of Things, to be either certain, primitive, general and fix'd Laws of Nature (or rules of Action and Passion among the parcels of the Universal Matter) or else the Shape, Size, Motion, and other primary Affections of the smallest parts of Matter, and of their first Coalitions or Clusters: especially those endowed with seminal Faculties or Properties, or (to dispatch) the admirable conspiring of the several parts of the Universe to the production of particular Effects; of all which it will be difficult to give a satisfactory Account, without acknowledging an intelligent Author or disposer of Things:

And the better to clear so weighty a Truth, let us further consider on this occasion, That not onely *Aristotle*, and those that, misled by his Authority, maintain the Eternity of the World, but very many other Philosophers and Physitians, who ascribe so much to Nature, that they will not be reduc'd to acknowledge an Author of it, are wont very much to delude

Physiologo qui
veritatem con-
templatur ulti-
marum causarū
cognitio non fi-
nis est, sed inci-
um ad primas
supremasque
causas profici-
endi,
Plutarch: lib:
de primo Fri-
gido.
Τὸ πρῶτον εἰς
τινὲς τὴν ἐμπ-
νεύσιν ἐξαρτῶν: Ari-
stot. Ethic.
Nicom. lib. 3:
cap. 8.

And do not ex-
plain the scale of
causes unto the
last cause.

Instances of things wherein their account is not satisfactory:

1. *In the particulars the Causes of which they ascribe Occult Qualities.*

both themselves and others in the account they presume to give us, as satisfactory of the Causes or Reasons of very many Effects: I will not instance in the Magnetick Properties of Things, nor any of those numerous abstrusities of Nature, which 'tis well known that the *Aristoteleans* are wont to refer to Sympathy, Antipathy, or Occult Qualities, and strive to put Men off with empty Names, whereby they do not so much lessen our Ignorance, as betray their own.

2. *When they ascribe Natures abhorrency of Vacuity to be the cause that Water doth ascend in Suction*

But I shall instance in those more obvious *Phænomena*, of which they suppose they have given us very satisfactory Accounts: If you ask one of those I speak of, whence it comes to pass that if a Man put one end of a long Reed into a Vessel full of Water, and suck at the other end, his Mouth will be immediately fill'd with that Liquor, he will readily tell you, That the Suction drawing the Air out of the cavity of the Reed, the Water must necessarily succeed in the place deserted by the Air, to prevent a Vacuity abhorr'd by Nature. If you likewise ask such a Man, Why to Women about a certain Age, their *Purgations Menstruæ* do commonly supervene, he will think he has sufficiently answered you, when he has told you, that about that Age, beginning to be ripe for Procreation, Nature has wisely provided that their superfluous Blood should be sent to the Uterine Vessels, partly to dis-burthen the Mass of Blood of an useless load, and partly to contribute Matter, or at least afford Nourishment in case of Conception. But though these Solutions are wont to be acquiesc'd in by such as those that give them, yet I see not how they can satisfy a rigid Reasoner. For not now to mention what may be objected against them out of some Modern Mechanical and Anatomical Observations, let us a little consider, that to say that the ascent of the Water in the first Problem, proceeds from Natures Detestation of a Vacuity, supposes that there is a kind of *Anima Mundi*, furnished with various Passions, which watchfully provides for the safety of the Universe; or that a Brute and Inanimate Creature, as Water, not onely has a power to move its

its heavy Body upwards contrary (to speak in their Language) to the tendency of its particular Nature, but knowes both that Air has been suck'd out of the Reed, and that unless it succeed the attracted Air, there will follow a *Vacuum*; and that this Water is withall so generous, as by ascending, to act contrary to its particular inclination for the general good of the Universe, like a Noble Patriot, that sacrifices his private Interests to the publick ones of his Countrey.

But to shew men by an easie Experiment how little Attraction is perform'd to avoid a *Vacuum*, I have sometimes done thus; I have taken a slender Pipe of Glasse, of about four Foot long, and putting one of the open ends of it into a Vessel full of Quick-silver, I have suck'd as strongly as I could at the other, and caus'd one to watch the ascent of the Quick-silver, and mark where it was at the highest, and I found not that at one suck, I could raise it up much above a Foot, and having caus'd a couple of strong Men, one after another, to suck at the same end of the same Pipe, I found not that either of them could draw it up much higher. Nor did it appear that by repeated Suctions, though the upper end of the Pipe were each time stopp'd, to hinder the relapse of the Quick-silver, it could at all be rais'd above the seven and twenty Digits at which it us'd to subsist in the *Torrecellian* Experiment *De Vacuo*: Whereas the same end of that Tube being put into a small Vessel of Water, I could at one suck make the Water swiftly ascend thorow the perpendicularly held Tube into my Mouth, which argues, that the ascension of Liquors upon Suction, rather depends upon the pressure of the Air (against the Liquors and the Suckers Chest) and their respective measures of Gravity and Lightness compar'd to that Pressure, then it proceeds from such an abhorrency of a *Vacuum* as is presum'd.

And so likewise in the other Question propos'd, it is imply'd, that there is in a Female Body something, that knows the rule of Physicians, that of a *Plethora*, the Cure is the convenient Evacuation of Blood, and that this intelligent Faculty is wise enough

Whereas the contrary is proved in the Suction of the Quick-silver.

When they assign the causes of the purgationes menstruae.

nough also to propose to it self the double end above-mention'd, in this Evacuation, and therefore will not provide a Quantity of Blood great enough to require an Excretion, nor begin it till the Female be come to an Age wherein 'tis possible for both the Ends to be obtain'd; and that also this presiding Nature is so charitable, as that Man-kind might not fail, it will make the Female subject to such Monethly Superfluities of Blood, from which Experience informs us, that a whole Set of Diseases peculiar to that Sex, does frequently proceed. And in a word, there is a multitude of Problems, especially such as belong to the use of the Parts of a humane Body, and to the Causes and Cures of the Diseases incident thereunto, in whose Explication those we write of, content themselves to tell us, That Nature does such and such a thing, because it was fit for her so to do; but they endeavor not to make intelligible to us, what they mean by this Nature, and how meer, and consequently brut, Bodies can act according to Laws, and for determinate Ends, without any knowledge either of the one or of the other. Let them therefore, till they have made out their *Hypothesis* more intelligibly, either cease to ascribe to irrational Creatures such Actions as in Men are apparently the Productions of Reason and Choice, and sometimes even of Industry and Virtue; or else let them with us acknowledg, that such Actions of Creatures in themselves Irrational, are perform'd under the superintendence and guidance of a Wise and Intelligent Author of Things. But that you may not mistake me, *Pyrophilus*, it will be requisite for me, to acquaint you in two or three words with some of my present thoughts concerning this subject: That there are some Actions so peculiar to Man, upon the account of his Intellect and will, that they cannot be satisfactorily explicated after the manner of the Actions of meer corporeal Agents, I am very much inclin'd to believe: And whether or no there may be some Actions of some other Animals, which cannot well be Mechanically explicated, I have not here leisure or opportunity to examine.

But

And when in other cases they ascribe to irrational Creatures such actions as in Men are the production of Reason and Choice,

But for (most of) the other *Phænomena* of Nature, methinks we may, without absurdity, conceive, That God, of whom in the Scripture 'tis affirm'd, *That all his Works are known to him from the Beginning*; having resolv'd, before the Creation, to make such a World as this of Ours, did divide (at least if he did not create it incoherent) that Matter which he

Acts 15. 18;

had provided into an innumerable multitude of very variously figur'd Corpuscles, and both connected those Particles into such Textures or particular Bodies, and plac'd them in such Situations, and put them into such Motions, that by the assistance of his ordinary preserving Concourse, the *Phænomena*, which he intended should appear in the Universe, must as orderly follow, and be exhibited by the Bodies necessarily acting according to those Impressions or Lawes, though they understand them not at all, as if each of those Creatures had a Design of Self-preservation, and were furnish'd with Knowledge and Industry to prosecute it; and as if there were diffus'd through the Universe an intelligent Being, watchful over the publick Good of it, and careful to Administer all things wisely for the good of the particular Parts of it, but so far forth as is consistent with the Good of the whole, and the preservation of the Primitive and Catholick Lawes established by the Supreme Cause. As in the formerly mention'd Clock of *Stratsburg*, the several Pieces making up that curious Engine, are so fram'd and adapted, and are put into such a motion, that though the numerous Wheels, and other parts of it, move several wayes, and that without any thing either of Knowledge or Design, yet each performs its part in order to the various Ends for which it was contriv'd, as regularly and uniformly as if it knew and were concern'd to do its Duty; and the various Motions of the Wheels, and other parts concur to exhibit the *Phænomena* design'd by the Artificer in the Engine, as exactly as if they were animated by a common Principle, which makes them knowingly conspire to do so, and might, to a rude Indian, seem to be more intelligent than

The Authors conceit concerning Gods Creation of the parts of the world, and so placing them that they (by the assistance of his ordinary concours) must needs exhibit these Phænomena.

Illustrated by the Motions of the Clock at Stratsburg.

How far such
borrowed and
Metaphorical
Phrases which
Custom has au-
thorized may be
used,

Quicksilver be-
ing heavier then
stones, they swim
thereon yet sink
in lighter liquors.

Conradus Dasypodius himself, that published a Description of it, wherein he tells the World, That he contrived it, who could not tell the hours and measure time so accurately at his Clock. And according to this Notion, if you be pleas'd to bear it in your memory, *Pyrophilus*, you may easily apprehend in what sense I use many common Phrases, which custom hath so authorized, that we can scarce write of Physiological subjects without employing either them, or frequent and tedious Circumlocutions in their stead: Thus when I say, that a stone endeavors to descend towards the Centre of the Earth, or that being put into a Vessel of Water, it affects the lowest place: I mean that not such a Mathematical Point as the Centre of the Earth, hath power to attract all heavy Bodies, the least of which, it being a point, it cannot harbor; or that a Stone does really aim at that unknown and unattainable Centre; but that, as we say, that a Man strives or endeavors to go to any place, at which he would quickly arrive, if he were not forcibly hindered by some Body that holds him fast where he is, and will not let him go: So a Stone may be said to strive to descend, when either by the Magnetical Steams of the Earth, or the pressure of some subtle Matter incumbent on it, or by what ever else may be the cause of Gravity, the Stone is so determined to tend downwards, that if all Impediments, interpos'd by the Neighboring Bodies, were removed, it would certainly and directly fall to the ground; or being put into a Vessel with Water, or any other Liquor much lesse heavy then it self (for on Quick-silver, which is heavier, Stones will swim) the same Gravity will make it subside to the bottom of the Vessel; and consequently thrust away its bulk of Water, which though heavy in it self, yet because it is lesse ponderous then the Stone, seems to be light. And so in our late instance in the Clock, if it be said that the Hand that points at the Hours affects a circular motion, because it constantly moves round the Centre of the Dial-plate, 'tis evident that the inanimate piece of Metal affects not that motion more then any other, but onely that the

im;

impression it receives from the Wheelles, and the adaptation of the rest of the Engine, determine it to move after that manner. And although if a man should with his Finger stop that Index from proceeding in its course, it may be said, in some sense, that it strives or endeavors to prosecute its former Circular Motion; yet that will signifie no more, then that by virtue of the Contrivance of the Engine, the Index is so impell'd, that, if the Obstacle, put by the Finger of him that stops it, were taken away; the Index would move onwards, from that part of the Circle where it was stop't, towards the mark of the next Hour. Nor do I by this, *Pyrophilus*, deny that it may in a right sense be said, as it is wont to be in the Schools, that *Opus Natura est opus Intelligentia*: Neither do I reject such common Expressions as *Nature alwaies affects and intends that which is best*, and *Nature doth nothing in vain*. For since I must, according to the above-mention'd Notion, refer many of the actions of irrational Creatures to a most wise Disposer of Things, it can scarce seem strange to me, that in those particulars in which the Author intended, as it was requisite that irrational Creatures should operate so and so for their own Preservation, or the Propagation of their Species, or the publick good of the Universe, their Actions being ordered by a Reason transcending Ours, should not only oftentimes resemble the Actings of Reason in Us, but sometimes even surpass them. As in effect we see that Silk-worms and Spiders can, without being taught, spin much more curiously their Balls and Webs, then our best Spinsters could; and that several Birds can build and fasten their Nests more Artificially then many a Man, or perhaps any man could frame and fasten such little and elaborate Buildings. And the Industries of Foxes, Bees, and divers other Beasts, are such, that 'tis not much to be wondered at that those Creatures should have Reason ascrib'd to them by divers Learned Men: who yet perhaps would be lesse confident, if they considered how much may be said for the Immortality of all rational Souls, and that the
subtle

That the instances of the Actions of divers Creatures resembling Reason commend the wisdom of God.

subtle Actings of these Beasts are determined to some few Particulars requisite for their own Preservation, or that of their Species; whereas on all other occasions, they seem to betray their want of Reason, and by their Voice and Gestures seem to expresse nothing, but the Natural Passions, and not any Rational or Logical Conceptions. And therefore, as when (to resume our former comparison) I see in a curious Clock, how orderly every Wheel and other part performs its own Motions, and with what seeming Unanimity they conspire to shew the Hour, and accomplish the other Designs of the Artificer, I do not imagine that any of the Wheels, &c. or the Engine it self is endowed with Reason, but commend that of the Workman who fram'd it so Artificially. So when I contemplate the Actions of those severall Creatures that make up the World, I do not conclude, the inanimate Pieces, at least, that 'tis made up of, or the vast Engine it self, to act with Reason or Design, but admire and praise the most wise Author, who by his admirable Contrivance can so regularly produce Effects, to which so great a number of successive and conspiring Causes are requir'd.

And thus much, *Pyrophilus*, having been represented concerning those, that rejecting from the Production and Preservation of Things, all but Nature, yet imbrace the Principles of the vulgar Philosophy, you will perhaps think it more then enough: but Object, That what is not to be expected from the barren Principles of the Schools, may yet be perform'd by those Atomical ones which we our selves have within not very many Pages seem'd to acknowledge Ingenious. And I know indeed, that the modern Admirers of *Epicurus* confidently enough pretend, that he and his Expositors have already, without being beholding to a Deity, clearly made out, at least the Origine of the World, and of the principal Bodies 'tis made up of: But I confesse, I am so far from being convinc'd of this, that I have been confirm'd rather, then unsetled in my Opinion, of the difficulty of making out the Original of the World,
and

and of the Creatures, especially the living Ones that compose it, by considering the accounts which are given us of the Nativity (if I may so speak) of the Universe, and of Animals, by those great Denyers of Creation and Providence, *Epicurus* and his Paraphrast *Lucretius*: Whose having shown themselves (as I freely confesse they have) very subtile Philosophers in explicating divers Mysteries of Nature, ought not so much to recommend to us their impious Errors, about the Original of Things, as to let us see the necessity of ascribing it to an Intelligent Cause. This then is the account of this matter, which is given us by *Epicurus* himself, in that Epistle of his to *Herodotus*, which we find in *Diogenes Laertius*: *Quod ad Meteora attinet existimari non oportet, aut motum, aut conversionem, aut Eccipsin, aut ortum occasumvè, aut alia hujuscemodi ideo fieri quod sit Praefectus aliquis, qui sic disponat, disposueritvè ac simul beatitudinem immortalitatèmq; possideat:* And having interposed some Lines, to prove that the Providence of God is not consistent with his Felicity, he addes, *Quare opinandum est, tum cum Mundus procreatus est, factos fuisse eos circumplexus convolventium se Atomorum, ut nata fuerit hac necessitas, quà circuitus tales obierint:* And elsewhere in the same Epistle, *Infiniti* (sayes he) *sunt mundi, alii similes isti, alii vero dissimiles. Quippe Atomè cum sint infinita, ut non multo ante demonstratum est per infinitatem spatiorum, & alibi alia, ac procul ab hoc ad fabrefactionem Mundorum infinitorum varè concurrunt.* And least this Epicurean Explication of the Worlds Original should seem to owe all its unsatisfactoriness to its obscure brevity, we shall not scruple to give you that elegant Paraphrase and Exposition of it, which *Lucretius* has delivered in his 5th Book, *De Rerum Natura*:

*Defects in the
Explication of
Nature by the
Epicureans who
deny the concurrence
of God*

*Sed quibus ille modis, conjectus, materiai
Fundavit Cælum, ac Terram Pontiq; profunda
Solis, Lunæ cursus ex ordine ponam,
Nam certe, neque conciliis primordia rerum*

L

Ordine

*Ordine se quaque atque sagaci mente locarunt;
 Nec quos quaque darent motus pepigere profecto:
 Sed quia multa modis multis primordia rerum
 Ex infinito jam tempore percita plagis,
 Ponderibusque suis, consuerunt concita ferri,
 Omnimodisque coire, atque omnia pertentare,
 Quacunq; inter se possent congressa creare;
 Propterea fit, ut magnum volgata per aenum,
 Omnigenos cætus & motus experiundo,
 Tandem conveniant: ea qua conjuncta repente
 Magnarum rerum fiant exordia sæpe
 Terræ maris, & cæli generisque animantium.*

The *Hypothesis* express'd in these Verse (which please our Author so well , that he has almost the same Lines in several other places of his Poem) he prosecutes and applies to some particular parts of the Universe in the same 5th Book: But whilst he thus refuseth to allow God an Interest in the Worlds production , his *Hypothesis* requires that we should allow him several things, which he doth assume, not prove: As First, That Matter is Eternal. 2. That from Eternity it was actually divided, and that into such insensibly small parts, as may deserve the name of Atoms; whereas it may be suppos'd, that Matter, though Eternal, was at first one coherent Mass, it belonging to Matter to be divisible, but not so of necessity, to be actually divided. 3. That the number of these Atoms is really infinite. 4. That these Atoms have an *inane Infinitum* (as the Epicureans speak) to move in. 5. That these Atoms are endowed with an almost infinite variety of determinate Figures, some being round, others cubical, others hooked, others conical, &c. whereas not to mention beforehand what we may elsewhere object, besides against this Assumption, he shewes not why, nor how this Atome came to be Spherical rather than Conical, and another Hooked rather than Pyramidal: But these Assumptions I insist not on, because of

two

two others much more considerable, which our Author is fain to take for granted in his *Hypothesis*: For 6ly, He supposes his Eternal Atoms to have from Eternity been their own Movers, whereas it is plain that Motion is no way necessary to the Essence of Matter, which seems to consist principally in Extension: For Matter is no lesse Matter, when it rests, then when it is in Motion; and we daily see many parcels of Matter passe from the state of motion to that of rest, and from this to that, communicating their motion to Matter that lay still before, and thereby loosing it themselves. Nor has any Man, that I know, satisfactorily made out how Matter can move it self: And indeed, in the Bodies which we here below converse withall, we scarce find that any thing is mov'd but by something else; and even in these motions of Animals that seem spontaneous, the Will or Appetite doth not produce the motion of the Animal, but guide and determine that of the Spirits, which by the Nerves move the Muscles, and so the whole Body, as may appear by the wearinesse and unweildinesse of Animals, when by much motion the Spirits are spent. And accordingly I find that *Anaxagoras*, though he believed, as *Aristotle* did after him, that Matter was Eternal, yet he discern'd that the notion of Matter not necessarily including motion, there was a necessity of taking in a *Mens*, as he stiles God, to set this sluggish Matter a moving. And I remember *Aristotle* himself, in one place of his *Metaphysicks*, disputing against some of the antienter Philosophers, asks, *Quonamque modo movebuntur si nulla erit actus causa? non enim ipsa materia seipsam movebit* αλλὰ τὸ πρῶτον τῶν rerum opifex *Virtus*: But though elsewhere I have met with Passages of his near of kin to this, yet he seems not to expresse his Opinion uniformly and clearly enough to engage me to define it or make a Weapon of it: And therefore I shall rather proceed to take notice, That according to the Epicurean *Hypothesis*, not onely the motion, but the determination of that motion is supposed. For *Epicurus* will have his Atoms move downwards, and that

*Aristot. Meta-
phys. lib. 12. c. 6.*

not in paralel Lines, lest they should never meet to constitute the World, but according to Lines somewhat inclining towards one another; so that there must be not onely motion, but gravity in Atoms, before there be any Centre of gravity for them to move towards; and they must move rather downwards then upwards, or side ways, and in such Lines as nothing is produc'd capable of confining them to. Which are Assumptions so bold and precarious, that I finde some, even of his Admirers, to be asham'd of them: Which will save me the labor of arguing against them, and allow me to take notice in the seventh place, That this Epicurean Doctrine supposes that a sufficient number of Atoms, and their motion downwards being granted, there will need nothing but their fortuitous course in their fall, to give a Being to all those Bodies that make up the World. Indeed, that the various coalitions of Atoms, or at least small Particles of Matter, might have constituted the World, had not been perhaps a very absurd Opinion for a Philosopher, if he had, as Reason requires, suppos'd that the great Mass of lazy Matter was Created by God at the Beginning, and by Him put into a swift and various motion, whereby it was actually divided into small Parts of several Sizes and Figures, whose motion and crossings of each other were so guided by God, as to constitute, by their occurrences and coalitions, the great inanimate parts of the Universe, and the seminal Principles of animated Concretions. And therefore I wonder not much that the *Milesian Thales* (the first of the Grecian Philosophers (as *Cicero* informs us) that inquir'd into these matters) should hold that Opinion which *Tully* expresses in these Words: *Aquam dixit esse initium rerum, Deum autem eam Mentem quae ex aqua cuncta finxerat*: And that of *Anaxagoras*, the same Author should give us this account, *Omnium rerum descriptionem & modum mentis infinitae vi ac ratione designari & confici voluit*: For though these great Men exceedingly err'd, in thinking it necessary that God should be provided of a pre existent, and by him not crea;

De Nat. Deorum, lib. 1.

Idem ibidem.

created Matter to make the World of, yet at least they discern'd and acknowledg'd the necessity of a Wise and Powerful Agent to dispose and fashion this rude Matter, and contrive it into so goodly a Structure, as we behold, without imagining with *Epicurus*, that chance should turn a Chaos into a World. And really it is much more unlikely, that so many admirable Creatures that constitute this one exquisite and stupendous Fabrick of the World should be made by the casual confluence of falling Atoms, justling or knocking one another in the immense vacuity, then that in a Printers Working-house a multitude of small Letters, being thrown upon the Ground, should fall dispos'd into such an order, as clearly to exhibit the History of the Creation of the World, describ'd in the 3 or 4 first Chapters of *Genesis*, of which History, it may be doubted whether chance may ever be able to dispose the fallen Letters into the Words of one Line. I ignore not that sometimes odde Figures, and almost Pictures may be met with, and may seem casually produc'd in Stones, and divers other inanimate Bodies: And I am so far from denying this, that I may elsewhere have opportunity to shew You, that I have been no careless Observer of such Varieties.

But first, even in divers Minerals, as we may see in Nitre, Chrystal, and several others, the Figures that are admired are not unquestionably produc'd by chance, but perhaps by something analogous to seminal Principles, as may appear by their uniform regularity in the same sort of Concretions, and by the practice of some of the skilfullest of the Salt peter Men, who when they have drawn as much Nitre as they can out of the Nitrous Earth, cast not the Earth away, but preserve it in heaps for six or seven Years, at the end of which time, they find it impregnated with new Salt-peter, produced chiefly by the seminal Principle of Nitre implanted in that Earth. To prove that Metalline Bodies were not all made at the beginning of the World, but have some of them a Power, though slowly to propagate their Nature when they meet with a dis-

That the figures in Nitre, chrystal, and divers Minerals are produced not by chance but by somewhat analogous to seminal principles.

posed Matter; you may find many notable Testimonies and Relations in a little Book of *Physico-Chymical Questions*; Written by *Jo: Conradus Gerhardus*, a Germane Doctor, and most of them recited (together with some of his own) by the Learned *Sennertus*: But lest you should suspect the Narratives of these Authors, as somewhat partial to their Fellow Chymists Opinions, I shall here annex that memorable Relation which I find recorded by *Linschotten*, and *Garcias ab Horto*, a pair of unsuspected Writers in this case concerning Diamonds, whereby it may appear that the seminal Principles of those precious Stones, as of Plants, are lodg'd in the Bowels of the Mine they grow in: *Diamonds* (sayes the first, in that Chapter of his Travels where he treats of those Jewels) *are digg'd like Gold out of Mines, where they digg'd one year the length of a Man into the Ground, within three or four years after there are found Diamonds again in the same place, which grow there; sometimes they finde Diamonds of 400 or 800 Grains.* *Adamantes* (sayes the latter) *qui altissimè in terra visceribus, multisque annis perfici debebant in summo fere solo generantur & duorum aut trium annorum spatio perficiuntur: Nam si in ipsa fodina hoc anno ad cubiti altitudinem fodias Adamantes reperies. Post biennium rursus illic excavato ibidem, invenies Adamantes.* And next, how inconsiderable, alas, are these supposed Productions of Chance, in comparison of the elaborate Contrivances of Nature in Animals? since in the Body of Man, for instance, of so many hundred Parts it is made up of, there is scarce any that can be either left out, or made otherwise then as it is, or plac'd elsewhere then where it is, without an apparent detriment to that curious Engine; some of whose parts, as the Eye, and the valves of the Veins, would be so unfit for any thing else, and are so fitted for the uses that are made of them, that 'tis so far from being likely that such skilful Contrivances should be made by any Being not intelligent, that they require a more then ordinary Intelligence to comprehend how skilfully they are made.

As

*Simpl: in India
nascenti lib. 1,
cap. 47.*

That the generation of Animals is much less to be accounted the production of Chance.

As for the account that *Lucretius*, out of *Epicurus*, *Tanta ergo qui videat, & talia potest existimare nullo affecta esse consilio, nulla providentia, nulla ratione divina, sed ex atomis subtilibus exiguis concreta esse tanta miracula? Nonne prodigio simile est, aut natum esse hominem qui hæc diceret, ut Lucippum, aut exitrisse qui crederet, ut Democritum, qui auditor ejus fuit, vel Epicurum in quem vanitas omnis de Lucippi fonte profluxit, lib. 2. c. 11.

Gives us of the first Production of Men, in I know not what Wombs adhering to the Ground, and which much more becomes him as a Poet, then as a Philosopher, I shall not here waste time to manifest its unlikeliness, that witty Father *Lactantius* having already done that copiously for me. And indeed it seems so pure a Fiction, That, were it not that the *Hypothesis* he took upon him to maintain, could scarce afford him any lesse extravagant account of the Original of Animals, the unsuitableness of this *Romance*, to those excellent Notions with which he has enriched divers other parts of his Works, would make me apt to suspect, that when he writ this part of his Poem, he was in one of the Fits of that Phrensie, which some, even of his Admirers, suppose him to have been put into by a Philtre given him by his either Wife, or M^{rs} *Lucilla*; in the Intervals of which, they say, that he writ his Books:

And here let us further consider, That as confidently as many Atomists, and other Naturalists, presume to know the true and genuine Causes of the Things they attempt to explicate, yet very often the utmost they can attain to in their Explications, is, That the explicated *Phænomena* May be produc'd after such a Manner as they deliver, but not that they really are so: For as an Artificer can set all the Wheels of a Clock a going, as well with Springs as with Weights, and may with violence discharge a Bullet out of the Barrel of a Gun, not onely by means of Gunpowder, but of compress'd Air, and even of a Spring. So the same Effects may be produc'd by divers Causes different from one another; and it will oftentimes be very difficult, if not impossible for our dim Reasons to discern surely which of those several wayes, whereby it is possible for Nature to produce the same *Phænomena* she has really made use of to exhibit them. And sure, he that in a skilful Watch-makers Shop shall observe how many several wayes

That the Hypotheses of Philosophy only shew that an effect May be produced by such a cause; not that it must,

Watches

Watches and Clocks may be contriv'd, and yet all of them shew the same things, and shall consider how apt an ordinary Man, that had never seen the inside but of one sort of Watches, would be, to think that all these are contriv'd after the same manner, as that whose Fabrick he has already taken notice of; such a Person; I say, will scarce be backward to think that so admirable an Engineer as Nature, by many pieces of her Workmanship, appears to be, can, by very various and differing Contrivances, perform the same things; and that it is a very easie mistake for Men to conclude, that because an Effect may be produc'd by such determinate Causes, it must be so, or actually is so. And as confident as those we speak of use to be, of knowing the true and adequate Causes of Things, yet *Epicurus* himself, as appears by ancient Testimony, and by his own Writings, was more modest, not onely contenting himself, on many occasions, to propose several possible wayes whereby a *Phenomenon* may be accounted for, but sometimes seeming to dislike the so pitching upon any one Explication, as to exclude and reject all others: And some Modern Philosophers that much favor his Doctrine, do likewise imitate his Example, in pretending to assign not precisely the true, but possible Causes of the *Phenomenon* they endeavor to explain. And I remember, that *Aristotle* himself (what ever confidence he sometimes seems to express) does in his first Book of *Meteors* ingeniously confess, that concerning many of Natures *Phenomena*, he thinks it sufficient that they may be so perform'd as he explicates them. But granting that we did never so certainly know in the general that these *Phenomena* of Nature must proceed from the Magnitudes, Figures, Motions, and thence resulting Qualities of Atoms, yet we may be very much to seek as to the particular Causes of this or that particular Effect or Event: For it is one thing to be able to shew it possible for such and such Effects to proceed from the Various Magnitudes, Shapes, Motions, and Concretions of Atoms, and another thing to be able to declare what precise,

and

That to a perfect knowledge there must not only appear the possible but the definite and re. l. not only the General but the particular Causes.

and determinate Figures, Sizes, and Motions of Atoms, will suffice to make out the propos'd *Phænomena*, without incongruity to any others to be met with in Nature: As it is one thing for a Man ignorant of the Mechanicks to make it plausible, that the motions of the fam'd Clock at *Stratsburg* are perform'd by the means of certain Wheels, Springs, and Weights, &c. and another to be able to describe distinctly, the Magnitude, Figures, Proportions, Motions, and (in short) the whole Contrivance either of that admirable Engine, or some other capable to perform the same things.

Nay, a Lover of disputing would proceed farther, and question that way of reasoning, which even the eminentest Atomists are wont to employ to demonstrate that they explicate things aright:

For the grand Argument by which they use to confirm the truth of their Explications, is, That either the *Phænomenon* must be explicated after the manner by them specified, or else it cannot at all be explicated intelligibly: In what sense we disallow not, but rather approve this kind of Ratiocination, we may elsewhere tell you. But that which is in this place more fit to be represented, is, That this way of arguing seems not in our present case so Cogent, as they that are wont to employ it think it to be: For besides that, it is bold to affirm and hard to prove that, what they cannot yet explicate by their Principles, cannot possibly be explicated by any other Men, or any other Philosophy; beside this, I say, that which they would reduce their Adversaries to, as an Absurdity, seems not to deserve that name: For supposing the Argument to be conclusive, That either the propos'd Explication must be allow'd, or Men can give none at all that is intelligible, I see not what absurdity it were to admit of the consequence: For who has demonstrated to us, That Men must be able to explicate all Natures *Phænomena*, especially since divers of them are so abstruse, that even the Learned'st Atomists scruple not to acknowledge their being unable to give an account of them:

Some defects in the wayes of Reasoning used by the most eminent Atomists.

M

And

And how will it be prov'd that the Omniscient God, or that admirable Contriver, Nature, can exhibit *Phænomena* by no wayes, but such as are explicable by the dim Reason of Man? I say, Explicable rather than Intelligible; because there may be things, which though we might understand well enough, if God, or some more intelligent Being then our own, did make it his Work to inform us of them, yet we should never of our selves find out those Truths. As an ordinary Watch maker may be able to understand the curiouslest Contrivance of the skilfullest Artificer, if this Man take care to explain his Engine to him, but would never have understood it if he had not been taught. Whereas to explicate the Nature and Causes of the *Phænomena* we are speaking of, we must not onely be able to understand, but to investigate them.

And whereas it is peremptorily insisted on by some Epicureans, who thereby pretend to demonstrate the excellency and certainty of their Explications, that according to them, Nature is declar'd to produce things in the way that is most facile and agreeable to our Reason: It may be replyed, That what we are to enquire after, is, how Things have been, or are really produced, not whether or no the manner of their Production be such, as may the most easily be understood by us: For if all things were, as those we reason withall maintain, casually produced, there is no reason to imagine that Chance considered what manner of their Production would be the most easily intelligible to us. And if God be allowed to be, as indeed he is, the Author of the Universe, how will it appear that He, whose Knowledge infinitely transcends ours, and who may be suppos'd to operate according to the Dictates of his own immense Wisdom, should, in his Creating of things, have respect to the measure and ease of Humane Understandings, and not rather, if of any, of Angelical Intellects, so that whether it be to God, or to Chance, that we ascribe the Production of things, that way may often be fittest or likelyest for Nature to work by, which is not easiest for us to understand.

And

And as for the way of arguing, so often employ'd (especially against the Truth we now contend for) and so much rely'd on by many Modern Philosophers, namely, That they cannot clearly conceive such or such a thing propos'd, and therefore think it fit to be reject'd; I shall readily agree with them in the not being forward to assent to any thing, especially in Philosophy, that cannot well be conceiv'd by knowing and considering Men: But there is so much difference among Men, as to their faculty of framing distinct Notions of things, and through Mens partiality or lazynesse, many a particular Person is so much more apt, then these Men seem to be aware of, to think, or at least, to pretend, that he cannot conceive, what he has no mind to assent to, that a man had need be wary how he rejects Opinions, that are impugn'd onely by this way of Ratiocination. By which, I hope, it will not be expected that we should be more prevail'd with, then that Sect of Philosophers that employes it most. And among those that resolve the *Phænomena* of Nature into the Mechanical Powers of Things, or the various Figures, Sizes and Motions of the parts of Matter; I meet with some, as the *Epicureans*, who tells us, They cannot frame a Notion of an Incorporeal Substance or Spirit, nor conceive how, if the Soul were such, it could act upon the Body: And yet others that seem no lesse speculative, seriously and solemnly profess, That they can conceive a clear and distinct Notion of a Spirit, which they believe the humane Soul, that regulates at least, if not produces divers Motions of the Body, to be; denying on the other side, That it can be clearly conceiv'd, either that any thing that is onely material can think, or that there can possibly be any *Vacuum* (that is, Place without any Body) in the Universe, both which the *Epicureans* profess themselves not onely to conceive as Possible, but to believe as True.

And thus much, *Pyrophilus*, it may suffice to have said in relation to those who would reject God from having any thing to do, either in the Production or Government of the World,

upon this ground, that they, if you will believe them, can explicate the Original and *Phænomena* of it without him; but 'tis not all, nor the greatest part of the Favorers of the Atomical Philosophy, that presume so much of themselves, and derogate so much from God: To say therefore something to the more moderate and judicious of that Perswasion, we will candidly propose on their behalf the most plausible Objection we can foresee against the Truth we have been all this while pleading for. They may then thus argue against us, That though the Atomists cannot sufficiently demonstrate from what Natural Causes every particular Effect proceeds, and satisfactorily explicate after what determinate manner each particular *Phænomenon* is produc'd; yet it may suffice to take away the necessity of having recourse to a Deity, that they can make out in general, That all the things that appear in the World, may, and must be perform'd by meerly corporeal Agents; or if you please, That all Natures *Phænomena* may be produc'd by the parcels of the great Mass of Universal Matter, variously shap'd, connected, and mov'd. As a Man that sees a screw'd Gun shot off, though he may not be able to describe the number, bignesse, shape and coaptation of all the Pieces of the Lock, Stock, and Barrel, yet he may readily conceive that the Effects of the Gun, how wonderful soever they may seem, may be perform'd by certain pieces of Steel or Iron, and some parcels of Wood, of Gun powder, and of Lead, all fashion'd and put together according to the exigency of the Engine, and will not doubt, but that they are produc'd by the power of some such Mechanical Contrivance of things purely Corporeal, without the assistance of spiritual or supernatural Agents.

In answer to this Objection, I must first profess to you, That I make a great doubt whether there be not some *Phænomena* in Nature, which the Atomists cannot satisfactorily explain by any Figuration, Motion, or Connection of material Particles whatsoever: For some Faculties and Operations of the

The most plausible argument of the Opposers of a Deity considered.

the reasonable Soul in Man, are of so peculiar and transcendent a kind, that as I have not yet found them solidly explicated by corporeal Principles, so I expect not to see them in haste made out by such. And if a spiritual Substance be admitted to enter the Composition of a Man, and to act by and upon his Body, besides that, one of the chief and fundamental Doctrines of the *Epicureans* (namely, That there is nothing in the Universe but *Corpus* and *Inane*) will thereby be subverted; it will appear that an Incorporeal and Intelligent Being may work upon Matter, which would argue, at least a possibility that there may be a Spiritual Deity, and that he may intermeddle with, and have an influence upon the Operations of things Corporeal: But to insist no longer on this, let us give a further and direct Answer to the propos'd Objection, by representing, That although as things are now established in the World, an Atomist were able to explain the *Phænomena* we meet with, by supposing the parts of Matter to be of such Sizes, and such Shapes, and to be mov'd after such a manner as is agreeable to the Nature of the particular *Phænomenon* to be thereby exhibited, yet it would not thence necessarily follow, That at the first production of the World, there was no need of a most powerful and intelligent Being to dispose that *Chaos*, or confus'd heap of numberless Atoms into the World, to establish the universal and conspiring Harmonie of things; and especially to connect those Atoms into those various seminal Contextures, upon which most of the more abstruse Operations, and elaborate Productions of Nature appear to depend: For many things may be perform'd by Matter variously figur'd and mov'd, which yet would never be perform'd by it, if it had been still left to it self without being, at first at least, fashion'd after such a manner, & put into such a Motion by an Intelligent Agent. As the Quill that a Philosopher writes with, being dip't in Ink, and then mov'd after such & such a manner upon white Paper, all which are Corporeal Things, or their motions may very well.

well trace an excellent and rational Discourſe; but the Quill would never have been mov'd after the requiſite manner upon the Paper, had not its motion been guided and regulated by the Underſtanding of the Writer: Or rather, yet once more to reſume our former Example of the *Stratsbourg* Clock, though a ſkilful Artiſt, admitted to examine and conſider it, both without and within, may very well diſcern that ſuch Wheels, Springs, Weights, and other Pieces of which the Engine conſiſts, being ſet together in ſuch a coaptation, are ſufficient to produce ſuch and ſuch Motions, and ſuch other Effects as that Clock is celebrated for, yet the more he diſcerns the aptneſs and ſufficiency of the parts to produce the Effects emergent from them, the leſs he will be apt to ſuſpect that ſo curious an Engine was produc'd by any caſual concurrence of the Parts it conſiſts of, and not rather by the ſkill of an intelligent and ingenious Contriver; or that the Wheels, and other parts, were of this or that Size, or this or that determinate Shape, for any other reaſon, than becauſe it pleas'd the Artiſicer to make them ſo; though the reaſon that mov'd the Artiſicer to employ ſuch Figures and Quantities, ſooner than others, may well be ſuppos'd to have been, that the Nature of his Deſign made him think them very proper and commodious for its accompliſhment, if not better than any other ſuited to the ſeveral Exigencies of it.

If an *Epicurean* ſhould be told, that a Man, after having been for ſome dayes really dead, became alive again, I think it will not be doubted, but that he would reject ſuch a Relation as impoſſible, and therefore too manifeſtly falſe to be believed by any Man in his Wits: And yet, according to his Principles, the Man, as well Soul as Body, conſiſted onely of divers Particles of the Univerſal Matter, by various Motions brought together, and diſpos'd after a certain manner: And conſequently, he muſt ground his perſwaſion that 'tis impoſſible to redintegrate the Engine once ſpoil'd by death, upon this,
That

That as Chance cannot with the least probability be presum'd to have produc'd such a strange Effect; so according to him, there can be no Cause assign'd, knowing and powerful enough, to rally and bring together again the disbanded and scattered parcels of Matter (or substitute other equivalent ones) that together with the remaining Carcase, compos'd the dead Man; so to reunite them to the rest; and lastly, so to place and put into Motion both the one and the other, as were requisite to make a living Man once more result from them. I know that this Example reaches not all the Circumstances of the Controversie we have been debating; but yet, if I mistake not, it will serve the turn for which I propose it: For, not now to insist upon this inference from it, That a considering Man may confidently reject a thing that is not absolutely impossible, provided it be highly incredible; not to insist on this, I say, the thing I aim at in the mention of it, is onely to shew, That such things may possibly be effected by Matter and Motion, as no wise Man will believe to have been produc'd by a bare Agitation of the Particles of Matter, not guided by the Superintendency of a Powerful and Knowing Director.

Now that the Atoms, or Particles of Matter of which the World consists, made no agreement with each other to convene and settle in the manner requisite to constitute the Universe, *Lucretius* does not so properly confess, as affirm, in that fore-cited Passage where he judiciously tells us, That

— *Certe neq. consiliis Primordia rerum
Ordine se quaque, atque sagaci mente locarunt:
Nec quos quaque darent Motus pepigere profecto,*

And the thing it self is manifest enough, from the Nature of Atoms confessedly inanimate and devoid of understanding.

So that although we should grant, *Pyrophilus*, the possible
Emer-

Emergency of the innumerable Effects we admire in the World, from the various Properties and Coalitions of Atoms, yet still you see the formerly mention'd difficulty (touching the Resulting of All things from Matter left to it self) would recur; and it would as well be incredible that an innumerable multitude of insensible Particles, as that a lesser number of bigger Parcels of Matter, should either conspire to constitute, or fortuitously juggle themselves into so admirable and harmonious a Fabrick as the Universe, or as the Body of Man; and consequently it is not credible that they should constitute either, unless as their motions were (at least, in order to their seminal Contextures and primary Coalitions) regulated and guided by an intelligent Contriver and Orderer of things. And I should so little think it a Disparagement to have but so much said of any *Hypothesis* of mine, that I suppose I may affirm it, without offending either the most sober, or the generality of the Atomical Philosophers, to whom, and to their Doctrine, my Writings will manifest me to be no otherwise affected then I ought.



ESSAY





E S S A Y V.

Wherein the discourse interrupted by the late Digression, is resumed and concluded.

IT remains now, *Pyroph*: that we at length return into the way from whence the foregoing Digression has, I fear, too long diverted us and that to prosecute and finish our Discourse, we take it up where we left it and were tempted to digress, namely, at the end of the III *Essay*, betwixt which, and the beginning of this V, all that has been interpos'd may be look'd upon but as a long Parenthesis

In the Third place then I consider, That whether or no it be true which our Antagonists suggest, that there are some things in Nature which tempt Philosophers more then they doe the Vulgar, to doubt or deny a God; yet certainly there are divers things in Nature that do much conduce to the evincing of a Deity, which Naturalists either alone discern, or at least discern them better then other Men: For besides the abstruse Properties of particular Bodies, not discover'd by any but those that make particular Enquiries into those Bodies, there are many things in Nature, which to a superficial Observer seem to have no relation to one another; whereas to a knowing Naturalist, that is able to discern their secret Correspondencies and Alliances, these things which seem to be altogether Irrelative each to other, appear so Proportionate and so Harmonious both betwixt themselves, and in reference to the Universe they are parts of, that they represent to him a very differing and incomparably better Prospect then to another

That there are some things in Nature which conduce much to the evincing of a Deity which are only well known to Naturalists.

N

Man

*Explai'd by the
comparison of the
uniting scatter'd
pieces of paint
into one face by a
Cylindrical Look-
ing-glass.*

Man: As he that looks upon a Picture made up of scatter'd and deform'd pieces, beholding them united into one Face, by a Cyndrical Looking-glass aptly plac'd, discerns the skill of the Artist that drew it, better then he that looks onely on the single parts of that Picture, or upon the whole Picture, without the uniting Cylinder. Which brings into my minde, That whereas in the Sacred Story of the Creation, when mention is made of Gods having consider'd the Works of each of the first six Days, at the end of it, it is said of the Work of every Day, *That God saw that it was good* (except of the second Day, because the separation of the Waters was but Imperfectly made on that day, and compleated in the next, on which it is therefore twice said, *That God saw that it was Good*) whereas. I say, when God look'd upon his Works in particular, it is onely said, *That he saw that they were good*; when He is introduc'd at the close of the Creation, as looking upon, and surveying his Creatures in their Harmony, and entire System, it is emphatically said, *That he saw every thing that he had made, and behold it was very good.* And if *Aristotle* be indeed the Author of the Book *De Mundo ad Alexandrum*, which passes for his, and is said to have been Written by him towards the end of his Life, it would not be unworthy our Observation to take notice, how he that in his other Writings is wont to talk of Gods Interest in the Creatures darkly, and hesitantly enough, is wrought upon by the Contemplation of the Universe, as it is an orderly Aggregate or System of the Works of Nature, to make Expressions of the Divine Architect, which are not unworthy of *Aristotle*, though being merely humane they cannot be worthy of God. Amongst many I shall single out some; and I hope, *Pyrophilus*, you will excuse me, if in this *Essay*, and some of the precedent ones, I do contrary to my custom, employ pretty store of Passages taken out of other Authors. For first, the nature of my Design makes it requisite for me to shew what Opinion the Heathen Philosophers had of the Study of Physiology, and what Power

*The Testimony of
the Author of the
book De Mundo
ascribed to Ari-
stotle: introduced*

Power their Contemplation of Nature had to engage them to Acts of Religion. And next, since divers of the same Passages wherein they had set down their Opinions, contain'd also the Grounds and Reasons of them, whereby they have anticipated much of what we should say upon the same subjects, I was unwilling to deprive you of their pertinent Ratiocinations, or rob them of the Glory of what they had well Written.

And this necessary Apology premis'd, let us proceed to consider his Passages; and first, *Restat* (says he) *ut summam de*

Arist. de Mundo, Cap. 6.

Causa differamus, quæ cunctarum ipsa rerum vim habet intrinsecam

& continentem, quemadmodum cætera perstrinximus: Flagitii enim instar esset, cum de mundo dicere instituerim, tractatu si minus exquisito fortasse, at certe qui sat esse possit ad formulam doctrina crassorem, intactam præcipuam mundi partem principemq; præterire. And a little after, *Etenim* (says he) *cunctarum quæ rerum natura complectitur, cum servator est Deus, tum*

Ibidem;

vero quæcunque in hoc mundo quoquomodo perficiuntur eorum omnium idem est Genitor: Non sic tamen ipse ut opificis in morem, animalisq; lassitudinem sentientis labore affici possit, ut qui ea facultate utatur, quæ nulli cedat difficultati, cujus ipse vi facultatis omnia in potestate continet, nec minus etiam quæ longius ab ipso videntur esse summotæ:

Eodem Cap.

To which purpose he elsewhere says, Augustius decentiusq; existimandum est, Deum summo in loco ita esse collocatum: Numinis ut tamen ejus vis per universum mundum pertingens, tum Solem, Lunamq; moveat, tum Cælum omne circumagat, simulq; causam præbeat eorum quæ in Terra sunt salutis atq; incolumitatis:

Eodem Cap.

And in the same Book he adds, Ut vero summam loquamur quod in navi Gubernator est, quod in Curru agitator, quod in Choro præcentor, quod deniq; lex in Civitate, & dux in exercitu, hoc Deus est in mûdo. Nisi si hæcenus interest, quod labor, & motus multiplex illos exercet & cura angunt varia, cum huic illaborata succedunt omnia, omnis molestia expertia. And certainly he that is a stranger to Anatomy, shall never be able to discern in the circulation of the blood, the motion of the Chyle, and the contrivance of all the parts of a humane Body, those

Of the admirable
contrivance of
the make of the
Musculus Mar-
supialis,

Proofs, as well as Effects, of an Omniscient *Διούργος*, or Artist, which a curious Anatomist will discover in that elaborate and matchless Engine: as I remember, I had occasion not long since to take notice of in the shape of that strange Muscle (the *obturator internus*) which some call from its Figure *Marsupialis*, serving to the motion of the Thigh. For this Muscle seems so made, as if Nature had design'd in it, to manifest, That she is skill'd in the Mechanics, not onely as a Mathematician that understands the powers of Distance, Weight, Proportion, Motion and Figure; but as an Artificer, or Handy-crafts man, who knows by dextrous Contrivances to furnish the more endanger'd parts of his Work, with what is more useful to make it lasting: There being (to omit other Observables, belonging to that Muscle) a deep notch made in the *Coxendix*, to shorten the way betwixt the two extremities of the Muscle, and make it bear upon the Bone with a blunter Angle. And because the *Tendon* is long, left, notwithstanding the former provision, it should be apt to fret out upon the edge of the Bone, Nature has provided for it a Musculous, piece of Flesh, wherein it is as it were sheath'd, that so it might not immediately bear, and grate upon the Bone; just as our Artificers use to sow Cases of Leather upon those parts of silken Strings, which being to grate upon harder Bodies, were otherwise endangered to be fretted out by Attrition.

And of the parts
of the Hand,

And a like skilfulness of Nature in the Mechanical Contrivance of the Parts, is more Obviously discernable in the Structure of that admirable Engine, by which such variety of other Engines are made, the Hand: where (not to mention the *Ligamentum Latum*, or Wrist-band, that keeps the *Tendons* that move under it from inconveniently starting up upon the Contraction of the respective Muscles) the wonderfull perforations that are made through the *Tendons* of the *Musculi perforati*, by those of the *Musculi perforantes*, for the more commodious motion of the Joynts of the Fingers, may conspicuously manifest the Mechanical Dexterity of Nature; as it may her Husbanding

banding (if I may so speake) of her Work, That in a *Fetus*, The contrivance for the circulation of the blood in a Fetus before the use of Respiration whilst it lies in the Womb, because the Lungs are not to be display'd as afterwards, and so the Blood needs not circulate thorow Them from the right Ventricle of the Heart, into the left, for the use of Respiration, as it must in grown Animals, she contrives a nearer way; and by certain short Pipes, peculiar to such young Creatures, she more commodiously performs in them the Circulation of the Blood, proportion'd to their present condition; and afterwards, when the Animal is brought out of the Womb into the open Air, and put upon the constant exercise of his Lungs, these temporary Conduits pipes little by little vanish. So careful is Nature not to do things in vain.

And therefore I do not much wonder, that *Galen*, though I remember he somewhere (unprovokedly and cautelessly enough) derides *Moses*, and seems not over-much inclin'd to make Religious acknowledgements; yet when he comes to consider particularly the exquisite Structure of a humane Body should break forth into very elevated, and even pathetical Celebrations of God, and tell us, That in his Books, *De usu Partium*, Galen's speech that his book De usu partium were as Hymns to the Creator. he compos'd Hymns to the Creators praise. And certainly he that shall see a skillful Anatomist dextrously dissect that admirable part of Man, the Eye, and shall consider the curious Contivance of the several Coats, Humors, and other Parts it consists of, with all their adaptations and uses, would be easily perswaded, That a good Anatomist has much stronger Invitations to believe, and admire an Omniscient Author of Nature, then he that never saw a Dissection, especially if he should see how all of these concur to make up one Optical Instrument to convey the Species of the visible object to the Optick Nerve, and so to the Brain; as I have with pleasure consider'd it, in the recent Eye of a Cat (for with keeping, it will grow flaccid) cut cleanly off, where the Optick Nerve enters the *Sclerotic*, and is going to expand it self into the *Retina*, for holding this Eye at a convenient distance

N 3

betwixt

Some Experi-
mentall Obser-
vations of the
Eye, and the
use of its parts
in order to Visi-
on,

The way to pre-
pare the Eyes of
Animals for the
better making
Observations on
them,

betwixt yours and a Candle, you may see the Image of a Flame lively exprest upon that part of the back side of the Eye at which the Optick Nerve enters the above-mention'd *Sclerotis*: Something of this kind we have also shewn our Friends with eyes of dead Men, carefully sever'd from their heads; and with the (dexterously taken out) Chrystalline humor of a Humane Eye, we have often read, as with a *Lens* or Magnifying glass. And to assist you in so pleasing a speculation, as that of the Eye, we shall adde, That by reason Ox Eyes are much larger, and more easier to be had then Humane ones, we are wont to make much use of them, and to discern somethings better in their Coats, we immerse them for a little while in boyling Water, and to be able to consider the form and bigness of the Vitreous and Chrystalline humors, better then the fluidity of the one, and the softness of the other are wont to allow Anatomists to do, we have sometimes, by a way hereafter to be set down, speedily frozen Eyes, and thereby have turn'd the Vitreous humor into very numerous and Diaphanous Films (as it were of Ice, and the Chrystalline into a firm Substance,) but (which perhaps you will wonder at) not Transparent. An Eye thus frozen, may be cut along that which Optical Writers call the Optical Axis, and then it affords an instructive Prospect, which we have not been able to obtain any other way. But because, notwithstanding this Expedient in the Eyes of Men, and the generality of Terrestrial Animals, the Opacousness of the *Sclerotis* hinders the Pictures that outward Objects (unless they be lucid ones) make within the Eye to be clearly discern'd. We think our selves oblig'd to that excellent Mathematician of your Acquaintance, *Pyrophilus*, who, upon some Discourse we had with him concerning this Subject, lately advis'd us to make use of the Eyes of white Rabbits (for if those animals be of another colour, he says, their Eyes will not prove so fit for our purpose) For having held some of these Eyes at a convenient distance betwixt my Eyes and the Window, I found them to be so transparent, That the
rayes

rayes proceeding from the Panes of Glass, Iron Bars, &c. of the Window, passing through the ChrySTALLINE humor and in their passage refracted, did on the *Retina* exhibit in an inverted Posture, according to the Optical Laws, the contracted, but lively Pictures of those external Objects; and those Pictures, by reason of the transparency of the *Sclerotic*, became visible through it to my attentive Eyes: As in a darken'd Room the shadows of Objects without it, projected on a fine sheet of Paper, may, by reason of the thinness of Paper, be seen thorow it by those that stand behind it. By Candle-light we could see little in the bottom of these Eyes but lucid Objects, such as the flame of the Candle, which appear'd tremulous, though inverted; but by Day-light we could manifestly discern in them both the motions of very neighbouring Objects, and the more vivid of their colours.

Some particulars wherein the Eyes of white Rabbits are better than others for observation.

And really, *Pyrophilus*, it seems to me not only highly dishonourable for a Reasonable Soul to live in so Divinely built a Mansion, as the Body she resides in, altogether unacquainted with the exquisite Structure of it; but I am confident, it is a great obstacle to our rendring God the Praises due to him, for his having so excellently lodg'd us, that we are so ignorant of the curious Workmanship of the Mansions our Souls live in; for not onely the Psalmist, from the consideration of the Divine Art display'd by God, in the moulding and fashioning his Body in the Womb, takes a just occasion to celebrate his Maker, *I will praise thee (says he) because I am fearfully and wonderfully made, marvellous are thy works, and that my Soul knoweth right well: My substance was not hid from thee, when I was made in secret, and curiously wrought* (with as much curiosity as Tapstry or Embroidery, as the Hebrew *Rukkanis* seems to import) *In the lowest parts of the Earth thine eyes did see my substance, yet being imperfect; and in thy Book all my members were written, which in continuance were fashioned, when as yet there were none of them.* But even from Galen himself Anatomical Reflections have been able to extort Expressions

That it is dishonourable for the soul to be unacquainted with the exquisite structure of the body being its own Mansion,

Psalm 139. v. 14; 15. 16.

Proved out of instances in the Psalmist and Galea.

of

Galen de plac:
Hip: & Plat.
Libr. 7,

of Devotion: *Cum igitur* (says he) *quod in omnibus recte fit; omnes ad artem referunt, quod autem in uno, aut duobus non ad artem, sed fortunam; merito ex nostri structura corporis licet admirari summam artem, equitatem & vim naturæ, quæ nos construxit. Constat siquidem corpus nostrum ex ossibus pluribus quam ducentis, ad singula ossa vero pervenit nutrienda vena; sicut ad musculos: cum hæc etiam arteria, & Nervi; pariaq; admissim sunt, & omnino similis atq; dextra animantis parte sita, iis quæ in altera sunt; Os ossi, Musculus musculo, Vena vena, Arteria arteria, ac Nervus nervo; idq; exceptis visceribus, atque nonnullis particulis quæ habere propriam descriptionem videntur. Duplices itaq; corporis nostri partes, omnino inter se sunt similes & magnitudine & conformatione, sicuti & consistentia quam voco juxta molliem, duritiemque differentia. Quemadmodum igitur de Humanis effectibus judicium faciamus, ex navim summa arte constructa cognoscentes peritiam artificis, ita etiam de Divinis facere convenit, corporisq; nostri Opificem admirari, quicunq; tandem is Deorum existat, etsi eum non videmus*

Perhaps it may be truly said yet further, That although in humane Bodies, many Wonders, as we have lately mention'd, have been discover'd to us by Anatomy, yet Anatomy itself has not discover'd to us all the Wonders to be met with in a humane Body, nor will detect them, till Anatomists be skil'd in some other things over and above that of dexterously Dissecting: For it seems very probable, that the excellent contrivance of some parts will never be fully apprehended, without a competent knowledge of the Nature of those Juices that are to pass thorow them, and some of them receive their beginning or some alteration in them; And the Nature of these Juices will scarce be exactly known, without some skill in divers parts of Physiology, and especially in Chymistry. Besides the reason of the Origination, Shape, Bulk, Length, Progress, and Insertion of each particular Muscle, can hardly be well accounted for without some skill in the Principles of Mechanicks, and in the nature and properties of Leavers, Pulleys,

leys, &c. Moreover, there is a certain Harmonious Proportion betwixt the parts of a humane Body, in reference both to the whole, and to one another, which is not wont to be heeded by Anatomists, but much taken notice of by Statuaries and Painters: For they reckon, that when a Mans Arms are display'd, the distance betwixt his middle Fingers is equal to the height of his Body; so they reckon sometimes seven, sometimes eight lengths of the Head, to the length of the Body, and four times the length of the Nose to that of the Head, as three times the same length to that of the Face: And divers such Observations we have met with among them, which we shall not now insist on, but rather tell you, That without some skill in Opticks, it will be hard for an Anatomist to shew the Wisdom of God in making the Crystalline humor of the Eyes of Men, onely of a somewhat convex or lenticular form, rather than as those of Fishes of an almost perfectly Spherical one (as to the anterior part, which is obverted to the outward objects.) Nor do I remember that in Anatomy Schools I have heard any account given of this difference, which yet tends much to manifest the Wisdom of the Author of Nature, who has so excellently suited the Eyes of Animals to the several parts of the Universe he design'd them to inhabit. For Men, and other Terrestrial Animals living in the Air, the Beams of Light, reflected from visible Objects, & falling over the *Cornea*, & the Aqueous humor, do necessarily suffer a Refraction there, as coming from the Air, which is a thinner *Medium* into a thicker, & so there needs the less of further Refraction to be made by the Crystalline humor, & consequently its Figure needs to be but moderately convex; whereas Fishes living constantly in the Water, the *Medium*, through which they see things, is almost of a like thickness with the *Cornea* & Aqueous humor; so that there being little or no refraction made in their Eyes but by the Crystalline it self, it was necessary that that should be exceedingly convex, that it might make a very great Refraction, & thereby unite the Beams nearer at hand; which if the Crystalline were less

*why the anterior
part of Fishes
Eyes ought to be
more Spherical
then those of
Men.*

convex, would tend to a point of Concourse beyond the *Resina*, and consequently paint on it but a languid and confus'd Picture of the Object they should represent.

That God made Man not after the Worlds Image but his own.

Lib. 3. De usu Rati.

As for *Paracelsus*, certainly he is injurious to Man, if (as some eminent Chymists expound him) he calls Man a Microcosm, because his Body is really made up of all the several kinds of Creatures the Macrocosm or greater World consists of, and so is but a Model or Epitomy of the Universe: For (to omit that the Antients (as *Gallen* inform us) gave the Title of Microcosmes to Animals in general) 'tis the Glory and Prerogative of Man, that God was pleas'd to make him not after the Worlds Image, but His own. On which occasion, give me leave to tell you, That however, the consideration of the dignity conferr'd on us in the Image of God, (in whatever that Image be resolv'd to consist) should, methinks, be some engagement to us to look upon our selves as belonging unto God; As our Saviour, from the Image of *Cesar* stamp't upon a Coyn, pronounc'd it fit to render unto *Cesar* the things of *Cesar*, and to God, those of God.

Arguments from Authority, and the Experience of all ages that the contemplation of the World has inclin'd Man to the Reverence of God,

In the fourth place, I consider that the universal experience of all Ages manifests, That the contemplation of the World has been much more prevalent to make those that have addict-ed themselves to it, Believers, then Benyers of a Deity: For 'tis very apparent that the old Philosophers, for the most part, acknowledg'd a God, and as evident it is by their want of revelation, by many Passages in their Writings, and by divers other things not now to be insisted on, That the consideration of the works of Nature, was the chief thing that Induc'd them to acknowledg a Divine Author of them. This Truth I could easily make out, were I at leisure to transcribe Testimonies, which, because I am not, I shall content my self to mention to you one, which may well serve for many, it being a Confession made by *Aristotle*, or whatever other Learned Philosopher it was, who writ the Book *De Mundo*, That Gods being the Architect and Upholder of the World, was the general belief of the

the Ages that preceded his. *Vetus* (sayes he) *sermo est à majoribus proditus, inter omnes homines, universatum ex Deo tum per Deum* Libro de Mus- constituta fuisse, atque coagmentata, nullamque naturam satis in- do, cap. 6.
structam ad salutem esse posse, quæ citra Dei præsidium, sua ipsa de-
munum tutela permissa sit: And as for both the Opinion of that e-
 minent Author himself, and the Grounds of it, he speaks of God
 and the Creation almost in the terms of St. Paul: *Proinde* (sayes Alibi eodem cap.
 he) *hæc etiam de Deo sentienda nobis sunt, illo quidem, si vim spe-*
ctes, Valentissimo, si decorem, Formosissimo, si vitam Immortali,
denique si virtutem Præstantissimo. Quæ propter cum sit incon-
 spicabilis natura omni interitura, ipsis nihilominus ipse cernitur
 ab operibus, atque ea quidem quæ ære quoquomodo affecto, quæ in
 terra, quæ in aqua, ea certe Dei opera esse merito dixerimus: *Dei*
inquam opera, cum imperio summo Mundum, ac pro potestate obti-
nentis, Ex quo deo ut inquit Empedocles Physicus.

Omnia quotquot erunt, quot sunt præsentia, quotque
Orta fuere antehac stirpes, hominésque feraque
Inde etiam volucres, piscésque humoris Alumni.

And those few Philosophers (if ever there have been any at
 all) that have been really Atheists, are no wayes considerable for
 their number, in respect of those that have asserted a Deity; and
 their Paradoxes have been lookt upon as so Irrational, that as
 soon as they have been propos'd, they have been disdainfully
 rejected and condemn'd by all the rest of Man-kind, who
 have look'd upon the Patrons of them as Monsters rather than
 Philosophers. And if there be, at this day, any Nations (as
 Navigators inform us there are in *Brasil*, and some other parts
 of the *Indies*) that worship no God, they consist not of Na-
 turalists, but Brute, and Irrational Barbarians, who may be
 suppos'd rather to ignore the Being of God, then deny it; and
 who at least are little lesse strangers to the Mysteries of Nature,
 then to the Author of it. And if it be a Truth that there

*That those people who worship no God are not Na-
 turalists but Bar-
 barians, and that
 their Atheisme
 doth continue for
 want of the con-
 templation of the
 World.*

are really such Atheistical People, it may serve to recommend to us the Study of Physiology, by shewing us, That without the help of any such innate believe, or perswasion of a God, as is suppos'd connatural to Man, Reason exercis'd upon the Objects the Creation presents us with, is sufficient to convince Philosophers of a Deity; and indeed such a care has God taken, to make his Being conspicuous in his Creatures, that they all seem loudly and unanimously to speak to their attentive

Psaln 100. 3.

Judg. 5. 10.

Cap. 6.

Considerers, in the Psalmists Language, *Know ye that the Lord, he is God: 'tis he that hath made us, and not we our selves:* And as it is said, *That the Stars in their courses fought against Sisera,* so it may be truly said, That not onely the Stars, but all the rest of the Creatures do in their courses fight against the Atheists, by supplying an unprejudic'd Considerer of them with Weapons fit to over-throw his impious Error. To which purpose, I remember *Aristotle*, in his Book *De Mundo*, makes use of a pretty Simile to declare the conspicuousnesse of the Creator in his Creatures: *Fama est* (sayes he) *Phidiam illum statuarium, quum Minervam illam qua est in Arce, coagmentaret, in medio ejus scuto faciem suam expressisse, oculosque fallenti artificio ita devinxisse simulachro, eximere ut inde ipsam si quis cu-*
peret, minime posset, aliter quidem certe, quam ut ipsum solveret simulachrum, opusq; ejusmodi compactile confunderet; Hanc e-
andem rationem Deus habet in Mundo ut pote qui universorum coagmentationem coherentem cohibeat & coarctet, incolumita-
témque Universitatis conservet; Nisi quatenus non medio ille loco in Terra scilicet, ubi Turbida Regio est, sed in excelsio situs est, purus ipse in puro loco.

A comparison of
the image of God
on the Creature
to that of Phidi-
as on Minerva's
Shield.

But to declare how Atheists may be reduc'd either to confess a first Cause, or to offer violence to their own Faculties, by denying things as certain as those, which 'tis apparent that (in other cases) themselves firmly assent to, would require a Discourse too large to be proper to be prosecuted here; and therefore if I have not, in another Treatise, an opportunity of insisting on that subject, I must content my self to refer you
for

for further satisfaction on it, to the Writers of Natural Theology.

Nor does Physiology barely conduce to make Men believe the existence of a Deity, but admire and celebrate the Perfections of it: And the noblest Worship from that greater part of the World, to which God did not vouchsafe any explicate and particular Revelation of his Will, hath been paid Him, by those whom the beauty of this goodly Temple of the Universe, transported with a rational Wonder at the Wisdom, Power, and Goodness of the Divine Architect. And this kind of Devotion being commonly proportionate to the discoveries of Nature that begot it, it needs not seem strange, that divers of the best Philosophers amongst the Heathens, should be the greatest Celebrators of God: And 'twas therefore perhaps not without cause that the *Indian* Gymnosophists the *Persian Magi*, the *Egyptian* Sacrificers, and the old *Gauls Druides*, were to their Peoples both Philosophers and Priests; and that in divers Civiliz'd Nations, Philosophy and Priesthood were so ally'd, that those whose Profession should give them most interest in the definition of Man, made a more strict profession of celebrating and praising God. I might easily, with divers Instances, manifest how great a Veneration the Study of the Creatures has given Philosophers, for those Attributes of God that are stamp'd upon them, and conspicuous in them: But my willingness to hasten to the more Experimental part of what I have to say concerning the usefulness of Physiology, makes me content my self to present you with a couple, or at least of Authorities, for proof of what has been alledg'd; the first shall be on *Galen*, in his third Book *De usu Partium*, where treating of the Skin that invests the sole of the Foot: *Cutem ipsam (says he) non laxam, aut subtilem, aut mollem, sed constrictam, & mediocriter duram, sensilemque ut non facile pateretur subdidit pedi sapientissimus Conditor noster: Cui commentarios hos, seu hymnos quosdam compono, & in eo pietatem esse existimans, non si Taurorum iugatibus ei plurimus quis-*

The noblest worship that has been paid God from such who have not had particular Revelation of his will, was a sacrifice from the Speculation of Gods Wisdom, Power, and Goodness in the fabrique of the Creature. *piam sacrificarit, & casias aliæque sexcenta unguenta suffumigavit: Sed si noverim ipse primus deinde exposuerim aliis quam sit ipsius Sapientia, quæ Virtus, quæ Providentia, quæ Bonitas; ignorantia quorum summa Impietas est, non si à sacrificio abstineras. Quod enim cultu convenienti exornavit omnia, nullique bona inviderit id perfectissimæ Bonitatis specimen esse statuo, Invenisse autem quo pacto omnia adornarentur summa Sapientia est, at effecisse omnia quæ voluit Virtutis est invicta.* To which Illustrious Passage he annexes much more, worthy of Galens Pen, and your perusal.

The Testimonies of Galen, Hermes, Paracelsus, L. Bacon. To this let me adde, in the second place, that of *Hermes Trimegistus*, almost at the very beginning of his first Book, Englished by Dr Everard: *He that shall learn and Study the things that are, and how they are ordered and governed, and by whom, and for what cause, or to what end, will acknowledge thanks to the Work-man, as to a good Father, an excellent Nurse, and a faithful Steward; and he that gives Thanks shall be Pious or Religious, and he that is Religious shall know both where the Truth is, and what it is; and learning that he will be yet more and more Religious.* To which I cannot but adde a resembling Passage of that great Hermetical Philosopher (as his Followers love to call him) *Paracelsus: Oppido (sayes he) admirabilis, in suis Operibus, Deus est; à quorum contemplatione nec interdiu, nec noctu desistendum, sed jugitur illorum indagationi vacandum est, Hoc enim est ambulare in Viis Dei.* All which bears witness to, and may, in exchange, receive Authority from that remarkable passage of that Great and Solid Philosopher, Sir Francis Bacon, who scruples not somewhere to affirm, "That it is an assured Truth, and a conclusion of Experience, That a little or superficial taste of Philosophy, may, perchance, incline the minde of a Man to Atheism, but a full Draught thereof, brings the Mind back again to Religion. For in the entrance of Philosophy, when the Second Causes, which are next unto the Senses, do offer themselves to the Mind of Man, and the Mind it self cleaves unto them, and dwells there,

Paracelsus Miscellanea Tract. 1.

Sir Francis Bacon Advant. of Learning, lib. 1.

there, a forgetfulness of the Highest Cause may creep in: But when a Man passeth further, and beholds the Dependency, Continuation, and Confederacy of Causes, and the Works of Providence, then according to the Allegory of the Poets, he will easily believe that the highest Link of Natures Chain must needs be tyed to the foot of *Jupiters* Chair; or (to speak our Chancellors thoughts more Scripturally) That Physiology, like *Jacobs* Vision, discovers to us a Ladder, whose Top reaches up to the foot-stool of the Throne of God: To which he deservedly addes, *Let no Man, upon a weak conceit of sobriety, or ill-applied moderation, think or maintain that a Man can search too far, or be too well studied in the Book of Gods Word, or in the Book of Gods Works, Divinity, or Philosophy: But rather let Men awake themselves, and chearfully endeavor and pursue an endless progress or proficiency in both; onely let them beware lest they apply Knowledge to Swelling, not to Charity; to Ostentation, not to Use: And again, That they do not unwisely mingle and confound these distinct Learnings of Theology and Philosophy, and their several Waters together.* Gen. 28.

In the fifth place, *Pyrophilus*, I consider, that when the Divines we are answering suppose Physiology likely to render a Man an Atheist, they do it (as hath above been noted already) upon this Ground, That Natural Philosophy may enable him to explicate both the regular *Phænomena*, and the aberrations of Nature, without having recourse to a first Cause or God. But though this supposal were as great a Truth, as we have endeavored to make its a Mistake, yet I see not why a Studier of Physiology, though never so great a Proficient in it, may not rationally be an utter Enemy to Atheism: For the Contemplation of the Creatures, is but one of the wayes of coming to be convinc'd that there is a God; and therefore, though Religion were unable to make use of the Argument drawn from the Works of Nature, to prove the existence of a Deity, yet has she other Arguments enough besides, to keep any Considerate and

*That Religion
has other Argu-
ments besides
those drawn from
the Works of Na-
ture enough to
keep any consi-
dering man from
Atheisme.*

Jam. 2. 19.

and Impartial Man from growing an Atheist. And here give me leave, for the sake of these Divines, to observe, That though the Devils be Spirits, not onely extreamly knowing in the Properties of Things (by their hidden skill in Physiolygy, by which they teach Magicians, and their other Clients, to do divers of the strange things for which they are admired) But also unmeasureably proud, and willing to pervert their knowledge to the cherishing of Atheism; yet *S^t James* informs us, *That they themselves believe there is a God, and tremble at him;* which argues, either that skill in Natural Philosophy does not necessarily lead to Atheism, or that there are other Arguments, besides those drawn from Science, sufficient to convince the most refractory of the existence of a Deity.

But not to insist on any thing of this nature, nor so much as to mention what proofs the consideration of our own Minds, and their in-bred Notions, may afford us of a Deity, I shall content my self to mind you, That the several Patefactions which God has been pleas'd to make of himself, to Man especially, those made by seasonably accomplish'd Prophecies, and by Miracles, do not onely demonstrate the Being, but the Providence, and divers of the Attributes of God. And indeed, methinks, the Divines we reason with may well allow these Patefactions to be capable of evincing the existence of a God, since they are sufficient, and, for ought I know, the best Arguments we have to convince a rational Man of the truth of the Christian Religion. For the Miracles of Christ (especially his Resurrection) and those of his Disciples, by being Works altogether supernatural, overthrow Atheism; and being owned to be done in Gods Name, and to authorize a Doctrine ascrib'd to his Inspiration, his Goodnesse, and his Wisdome, permit us not to believe that he would suffer such numerous, great, and uncontrouled Miracles, to be set as his Seals to a Lie, and delude Men little less then inevitably into the belief of a Doctrine not true. And as for the Miracles themselves (especially that

of

of Christs Resurrection, so much, and so deservedly insisted on by *Peter* to the Jewes, and *Paul* to the Gentiles) the truth of them is so ascertain'd to us by many of the solemnest, and most authentick wayes of Attestation, whereby the certainty of Matters of Fact is capable of being satisfactorily made out, that 'tis hard to shew how these Testimonies can be deny'd, without denying some acknowledg'd Principle of Reason, or some other received Notion, which these Contradictors Opinions or Practice manifest them to look upon as a truth. And upon this account, so much might be said to evince the reasonableness of assenting to the Christian Religion, and to shew, that as much may be said for it, as need be said for any Religion, and much more then can be said for any other; that it need be no wonder, that, as Learned Men as ever the World admir'd, have not onely been many of them Embracers, but some of them Champions of it. But having more fully, in another Treatise, discours'd of this subject, I shall content my self to make this Inference from what has been alledg'd, that since the most Judicious Propagators of Christianity have held and found, that, upon the score of Gods miraculous Revelations of himself, rational Men might be brought to believe the abstruse Articles of the Christian Religion, those Revelations cannot but be sufficient to convince them of so fundamental and resurgent a Truth (which all the others suppose) as that of the existence of God.

In the sixth and last place, I will here adde (on this occasion) that an insight into Physiological Principles, may very much assist a Man to answer the Objections of Atheists, against the Being of a Deity, and the Exceptions they make to the Arguments brought to prove that there is one: For though it has long been the custome of such Men, to talk as if themselves, and those of their mind, were not alone the best, but almost the onely Naturalists; and to perplex others with pretending, that, whereas it is not conceivable how there can be a God,

all things are by the principles of the Atomical Philosophy, made clear and facil. Though this, I say, have long been us'd among the Opposers of a Deity, yet he that not regarding their confidence, shall attentively consider the very first Principles of things, may plainly enough discern, that of the Arguments wherewith Natural Philosophy has furnish'd Atheists, those that are indeed considerable, are far fewer then one would readily think; and that the difficulty of conceiving the Eternity, Self-existence, and some other Attributes of God (though that afford them their grand Objection) proceeds not so much from any absurdity belonging to the Notion of a Deity, as such; as from the difficulty which our dim humane Intellects finde to conceive the nature of those first Things (whatever we suppose them) which, to be the Causes of all others, must be themselves without cause: For he that shall attentively consider, what the Atomists themselves may be compell'd to allow concerning the Eternity of Matter, the origine of local Motion (which plainly belongs not to the Nature of Body) the infinity or Boundlessness of space, the Divisibleness or non-Divisibility of each Corporeal Substance into infinite Material Parts, may clearly perceive that the Atomist, by denying that there is a God, cannot free his Understanding from such puzzling Difficulties as he pretends to be the Reasons of his Denyal. For instead of one God he must confesse an infinite number of Atoms to be Eternal, Self-existent, Immortal, Self-moving, and must make suppositions, incumbred with Difficulties enough to him that has competently accustomed his Thoughts to leave Second Causes beneath them, and contemplate those Causes that have none. But I am unwilling to swell this Essay, by insisting on such Considerations as these, especially since you may finde them more aptly deduc'd in other Papers, some of which treat of the Truth of Christian Religion, and others are design'd for the Illustration of some things in this
and

That the difficulty of conceiving the Eternity self-existence and other attributes of one God is lesse then to conceive infinite eternal self-existent and self-moving Atomes.

and the fore-going Essayes. For I must confess to you, *Pyrophilus*, that by reason of the sundry Avocations, I have been so diverted from proposing some of the Reasons I have employ'd to their best advantage, that I my self, at another time, could have both mention'd them with lesser disadvantage, and have added divers others: And therefore I have not onely had thoughts of enlarging upon some Passages of our past Discourse, but I long since made a Collection (though it be not now in my power) of Observations, and Experiments to elucidate a Point in one of those Discourses, whereby may be enervated one of the three chief Physiological Reasonings, that I have met with among the Atheists.

Upon consideration of all the Premises, I confess, *Pyrophilus*, that I am inclined to think there may, perhaps, be more cause to apprehend, that the delightfulness of the Study of Phisiology should too much confine your Thoughts and Joyes to the Creatures, then that your Proficiency in it should bring you to dis-believe the Creator: For I have observ'd it to be a fault, incident enough to Ingenious Persons, to let their minds be so taken up, and, as it were, charm'd with that almost infinite variety of pleasing Objects, which Nature presents to their Contemplation, that they too much dis-relish other Pleasures and Employments, and are too apt to undervalue even those wherewith the improv'd Opportunities of serving God, or holding Communion with Him, are capable of Blessing the Pious Soul.

But, *Pyrophilus*, though comparatively to Fame, and Mistresses, and Baggs, and Bottles, and those other transient, unsatisfactory, (in a word) deluding Objects, on which the greatest part of mistaken Mortals, so fondly dote, the entertaining of our Noblest Faculties, with Objects suited to them, and proper both to gratifie our Curiosity, and to enrich our

understandings, with variety of acceptable and useful Notions, affords a satisfaction that very well deserves the choice and preference of a rational Creature: Yet certainly, *Pyrophilus*, as God is infinitely better then all the things that he has made, so the Knowledge of Him is much better then the knowledge of them; and he that has plac'd so much delightfulness in a Knowledge, wherein he allows his very Enemies to become very great Proficients, has sure reserv'd much Higher, and more contenting Pleasures to sweeten and endear those Disclosures of Himself, which He vouchsafes to none but those that love Him, and are lov'd by Him.

And therefore, *Pyrophilus*, though I will allow you to expect from the Contemplation of Nature a greater satisfaction, then from any thing you need decline for it, yet I would not have you expect from it any such satisfaction as you may entirely acquiesce in, for nothing but the enjoyment of him that made the Soul for himself can satisfy it, the Creatures being as well incapable to afford us a compleat Felicity by our Intellectual Speculations of them, as by our sensual Fruitions of them; for though the knowledge of Nature be preferable by odds to those other Idols which we have mention'd, as inferior to it, yet we here attain that knowledge, but very imperfectly, and our acquisitions of it cost us so dear, and the Pleasures of them is so allay'd with the disquieting Curiosity they are wont to excite, that the wisest of Men, and greatest of Philosophers among the Antients, scruples not, upon his own experience, to call the adding of *ones heart to seek and search out by Wisdome, concerning all things that are done under the Heaven, a sore travel given by God to the sons of Men, to be exercis'd* (or, as the Original hath it, *so afflict themselves*) *therewith*: And the same experienc'd Writer elsewhere tells us, *That he that increases knowledg, increases sorrow*. And 'twas perhaps for this reason that *Adam* was form'd out of Paradise, and afterwards by God brought into it, to intimate, That

Felicity

As God is infinitely better then all his Creatures so the knowledge of him is better then the knowledge of his Creatures.

The Imperfection and disquiet that there is in humane science.

Ecclesi. 1. 17

Ecclesi. 1. 18

Felicity is not a thing that Man can acquire for himself, but must receive as a free gift from the liberal Hand of God: And as the Children of the Prophets sought translated *Elias* with very great diligence, but with no successe, so do we as Fruitlessly as Industriously, seek after perfect Happinesse here, both they and we, missing of what we seek for the same reason; because we seek for that on Earth, which is not to be found but in Heaven: And this I forewarn you of, *Pyrophilus*, not at all to discourage you from the study of Physiology, but to keep you from meeting with that great Discouragement of finding in it much less of satisfaction then you expected, and overgreat expectation from it, being one of the disadvantageous Circumstances with which it is possible for any thing to be enjoyed.

But at length, *Pyrophilus*, though late, I begin to discern into how tedious a digression my zeal for Natural Philosophy; and for you, has misled me, and how it has drawn from my Pen some Passages, which may seem to relish more of the Preacher, then the Naturalist; yet I might alledge divers things to justify, or, at least, extenuate what I have done: As first, That if in making this Excursion I have err'd, I have not done so without the Authority of great Examples; for not only *Seneca* doth frequently both season his Natural Speculations with Moral Documents and Reflections, and owns, that he purposely does so, where he sayes, *Omni rebus, omnibusq; sermonibus aliquid salutare miscendum est, cum imus per Occulta Natura*, &c. but even *Pliny* (as far as he was from being guilty of over much Devotion) does from divers Passages in his Natural History, allow himself to take occasion to inveigh against the Luxury, Excesses, and other Epidemical Vices of his time. And I might next represent, that perhaps the endeavoring to manifest, that the knowledg of the Creatures should, and how it may be referr'd to the Creators Glory, is not altogether impertinent to the design I have of promoting

2 King. cap. 2.

*Seneca Nat.
Quaest. lib. 2.
cap 59.*

How the Favour
of God conduces
to promote Mens
proficiency in
the Study of Na-
ture.

Jam. i. 17.

Isa. 28. 25, 26.

Gen. 31.

Physiology, for it seems consonant both to Gods Goodnesse, and that repeated Axiome in the Gospel, which tells us, *That he that improves his Talents to good uses, shall be intrusted with more*, That the imploying the little Knowledge I have in the service of Him I owe it to, may invite Him to increase that little, and make it lesse despicable. And perhaps it is not the least cause of our ignorance, in Natural Philosophy it self, that when we study the Great Book of Nature, call'd *The Universe*, we consult, peradventure, almost all other Expofitors to understand its Myfteries, without making any address for instruction to the Author, who yet is justly stil'd in the Scripture, *That Father of Lights* (in the plural Number) *from whom descends every good and every perfect Gift*, not only those supernatural Graces, that relate to another World, but those intellectual Endowments, that qualifie Men for the prosperous Contemplation of this: And therefore in the Evangelical Prophet, he is said, to instruct even the Plough-man, and teach him the skill and understanding he displayes in his own Profession. And though I dare not affirm, with some of the *Helmontians* and *Paracelsians*, that God discloses to Men the Great Mystery of Chymistry by Good Angels, or by Nocturnal Visions, as he once taught *Jacob*, to make Lambs and Kids come into the World speckled, and ring-streaked; yet perswaded I am, that the favor of God does (much more then most Men are aware of) vouchsafe to promote some Mens Proficiency in the study of Nature, partly by protecting their attempts from those unlucky Accidents which often make Ingenuous and Industrious endeavors miscarry; and partly by making them dear and acceptable to the Possessors of Secrets, by whose Friendly Communication they may often learn that in a few Moments, which cost the Imparters many a Years toyl and study; and partly too, or rather principally, by directing them to those happy and pregnant Hints, which an ordinary skill and industry may so improve as to do such things, and
make

make such discoveries by virtue of them, as both others, and the person himself, whose knowledge is thus encreased, would scarce have imagin'd to be possible: And in effect, the chiefest of the Secrets that have been communicated to me, the Owners have acknowledg'd to me to have been attain'd, rather, as they were pleas'd to speak, by accidental Hints, then accurate Enquiries: confessions of this nature I have divers times met with in the Writings of the more Ingenious of the Chymists, and of other Naturalists, and by one of these accidental Hints, of late, the acute and lucky *Pecquet* was directed to find the newly discovered *Lactea Thoracica*, as before him *Asellius* found without seeking, as himself confesseth, the *Lactea Mesenterica*, and by an accident too (as himself hath told me) did our industrious Anatomist, Dr *Folius*, first light upon those yet more freshly detected Vessels, which afterwards the Ingenious *Bartholinus*, without being inform'd of them, or seeking for them, hath met with, and acquainted the World with, under the name of *Vasa Lymphatica*; and the two great Inventions of the later Ages, Gunpowder, and the Loadstones respect unto the Poles, are suppos'd to be due rather to Chance, then any extraordinary skill in Philosophical Principles (which indeed would scarce have made any Man dream of such extravagant Properties, as those of Magnetick Bodies) As if God design'd to keep Philosophers humble, and (though he allow regular Industry, sufficient encouragement, yet) to remain Himself dispenser of the chief Mysteries of Nature.

To what hath been represented, *Pyrophilus*, I might adde much more to excuse my Excursions, if I were not content to be beholden to you for a Pardon, and to invite you to grant it me, I shall promise you to be very careful not to repeat the like offence, and whereas most Chymical Writers take occasion

The reason of the
Authors so long
discourse on this
Subject.

sion from almost every Discovery or Process they acquaint us with, to digress and wander into tedious, and too often dull and impertinent Theological Reflections or Sermons. I have troubled you with almost all that I have to say (to you) of Theological at once, and I have endeavored to sprinkle it as far as the subject would allow me, with some Passages Experimental. And indeed I should not at all have engag'd my self into so long a Discourse of the not only Innocency, but Usefulness of the knowledge of Nature, in reference to Religion, but that I could not acquiesce in what I had met with on that subject in any of the Writers I have perus'd, Divines being commonly too unacquainted with Nature, to be able to manage it Physiologically enough, and Naturalists commonly esteeming it no part of their work to treat of it at all. And therefore I scruple not to confess freely to you, *Pyrophilus*, that, as I shall think my self richly rewarded for all the ensuing Essays, if the past Discourse but prove so happy as to bring you to value, and to make the Religious use of the Creatures recommended to you in it: So I had rather any of my Papers should be pass'd by unperus'd, than those parts of these Essays that treat of that use: And indeed 'tis none of the least of Satisfaction, I hope, to derive from my Physical Composures, that by premising before them the now almost finish'd Discourse, I have done my hearty endeavor to manifest and recommend the true use of all the Discoveries of Nature, which either my Enquiries, or your own, may afford you. And indeed for my part, *Pyrophilus*, I esteem the Doctrine I have been pleading for of that importance, that I am perswaded, That he that could bring Philosophical Devotion into the request it Merits, should contribute as much to the solemnizing of Gods Praises, as the Benefactor of Choristers and Founders of Chauntries, and not much lesse then *Dauids* so celebrated

brated designation and settlement of that Religious Levitical Musick, instituted for the solemn Celebration of God.

For the sensible Representations of Gods Attributes to be met with in the Creatures, occurring almost every where to our observation, would very assiduouly solicit us to admire Him, did we but arightly discern Him in them: And the Impressions made on the Mind by these Representations, proceeding not from a bare (and perhaps languid) whether Believe or Notion of the Perfections express'd in them, but from an actual and operative intuition of them, would excite an admiration (with the Devotion springing thence) by so much the more intense, by how much (it would be) more rational. And sure, *Pyrophilus*, so much admirable Workmanship as God hath display'd in the Universe, was never meant for Eyes that wilfully close themselves, and affront it with the not judging it worthy the speculating. Beasts inhabit and enjoy the World: Man, if he will do more, must study, and (if I may so speak) Spiritualize it: 'Tis the first act of Religion, and equally obliging in all Religions: 'Tis the duty of Man, as Man; and the Homage we pay for the Priviledge of Reason: Which was given us, not onely to refer our selves, but the other Creatures, that want it, to the Creators Glory. Which makes me sometimes angry with them who so busie themselves in the Duties and Employments of their second and superinduc'd Relations, that they will never find the leisure to discharge that Primitive and Natural Obligation, who are more concern'd as Citizens of any place, then of the World; and both worship God so barely as Catholick or Protestants, Anabaptists or Socinians, and live so wholly as Lords or Council-lors, *Londoners* or *Parisians*, that they will never find the leisure, or consider not that it concerns them to worship and live as Men. And the neglect of this Philosophical Worship of

Beasts inhabit and enjoy the world, 'tis mans duty to Spiritualize it.

That it being the prime Duty of Man to give God the honour of his Creatures it is to be preferr'd before secondary Duties.

Q

God,

Pfal. 47. 7.

Pfal. 150. 2.

God, for which we are pleading, seems to be culpable in Men proportionably to their being qualified, and comply with that invitation of the Psalmist, to *sing Praises* to God *with understanding*, or (the Expression in the Original being somewhat ambiguous) *to sing to him a learn'd Canticle*, as he elsewhere speaks, *to praise him according to his excellent Greatness*. For Knowledge being a gift of God, intrusted to us to glorifie the Giver with it, the Greatness of it must aggravate the neglect of employing it gratefully; and the sublimest Knowledge here attainable will not destroy, but onely heighten and enoble our admiration, and will prove the Incense or more spiritual and acceptable part, of that Sacrifice of Praise (for those reflections which their Nature makes onely acts of Reason, their End may make acts of Piety) wherein the Intelligent Admirer offers up the whole World in Eucharists to its Maker. For admiration (I do not say astonishment or surprize) being an acknowledgment of the Objects transcending our Knowledge, the learner the transcendent Faculty is, the greater is the admired Objects transcendence acknowledg'd: And certainly, Gods Wisdome is much less glorifi'd by the vulgar astonishment of an unlettered Starer (whose ignorance may be as well suspected for his Wonder, as the excellency of the Object) then from their learned Hymns, whose industrious Curiosity hath brought their understandings to a prostrate Veneration of what their Reason, not Ignorance, hath taught them not to be perfectly comprehensible by them.

And as such Persons have such piercing Eyes, that where a transient or unlearned glance scarce observes any thing, they can discern an adorable Wisdome, being able (as I may so speak) to read the Stenography of Gods omniscient hand; so their skilful Fingers know how to choose, and how to touch those Strings that may sound sweetest to the Praise of their Maker.

Maker? And on the open'd Body of the same Animal, a skilful Anatomist will make reflections, as much more to the honor of its Creator, than an ordinary Butcher can; as the Musick made on a Lute, by a rare Lutanist, will be preferable to the noise made on the same Instrument by a Stranger unto Melody. And give me leave to tell you, *Pyrophilus*, that such a reasonable Worship (λογικη λατρεία) of God (to use *St Paul's* Expression, though in an other sense) is perhaps a much nobler way of adoring him, than those that are not qualified to practise it, are aware of, and is not improper even for Christians to exercise: For *Pyrophilus*, it would be considered, That as God hath not by becoming (as the Scripture more than once styles him) our Saviour laid by his first Relation to us as our Creator (whence *St Peter* exhorts, even the suffering Christians of his time, to commit their Souls to God under the notion of a Faithful Creator) so neither hath he given up his right to those Intelligent Adorations from us, which become us upon the account of being his rational Creatures; neither are such performances made lesse acceptable to him by the filial relation into which Christ hath brought us to him, that Glorious relation as well endearing to him our services as our persons.

That the different greatness in the knowledge make a like difference in the Honor given to the Creator.

Rom. 12.1.

Tim. 1. 1.
Tit. 2. 10.

1 Pet. 4. 19.

God by becoming our Saviour has not laid aside the Relation of a Creator.

And let me adde, *Pyrophilus*, that not onely *Galen* (as we have seen already) tells us, That the discerning ones self, and discovering to others the Perfections of God display'd in the Creatures, is a more acceptable act of Religion, than the burning of Sacrifices or Perfumes upon his Altars; and not onely *Trismegistus* forbidding *Asclepius* to burn Incense, tells him, *That the Thanks and Praises of Men, are the noblest Incense that can be offered up to God*: But God himself (in his written Word) is pleas'd to say, *That he that sacrificeth Praise*

That he who sacrificeth Praise honoureth God.

Hermes Trismeg. In Asclep. cap. 15.

The Conclusion. (for so 'tis in the Original) *honoreth him*: And the Scripture
Hab. 13. 15. consonantly mentions as a very acceptable part of Religious
 Worship, the *Sacrifice of Praise, and the Calves of our Lips*:
 By offering up of which, we make that true use of the Crea-
 tures, of so referrring them to their Creators Glory, that (to
 conclude this Discourse by Crowning it (as it were) with that
Rom. 11. 36. excellent Circle mention'd by the Apostle) *As all things are*
Of him, and Through him, so they may be *To him: to whom be*
Glory for ever Amen.



T H E



*The Citations English'd.**Pag. 24. Seneca de Otio Sap. Cap. 32.*

NATURE, conscious to her Self of her own Beauty and Artifice, hath given us a curious searching Wit, and to so excellent and great shewes, begat us to be Spectators; otherwise, she would have lost the Fruit of her Self, if to a desert and solitude she should have set forth so magnificent, so famous, so finely drawn, so fair and many wayes beautiful Pieces. That you may know she would not only have them seen, but look'd upon, take notice of the place she hath given us: For she hath not onely made Man of an upright Stature, but being so made, for better Contemplation, that he might follow with his Eye the course of the Stars, from the Rising to the Setting, and carry about his Looks, together with his whole Body, she hath both given him a tall Head, and placed that upon a flexible Neck: Then she shewes six Constellations by Day, and six by Night; She hath laid open every part of her Self, that by those things which she hath offered to the Eyes of Man, she might breed a desire of knowing the rest. Yet neither do we see all her Works, nor those that we see, do we see in those Proportions which they truly have: But our Sight, by searching, does open a way unto it self, and lay the grounds of Truth, that so Inquiry may pass from things that are plain to things that are obscure, and find somewhat more Ancient even then the World it self, See *Sen. de Vita Beata, Cap. 32.*

Pag. 28. What does he that contemplates the Nature of the Universe, of honor unto God; This, that his great Works are not without a Witnesse.

P. 28.

P. 28. Sen. 2. de Ira. cap. 27.

‘We are not the cause of the seasons and returns of Summer and Winter to the World: These have their own Lawes, accommodated to the Exercise of Divine Beings: We arrogate too much honor to our selves, if we esteem our selves worthy that such vast Bodies should fulfil such Motions for our sakes.

Ib. Lactantius de Ira Dei, cap. 13.

‘True is the Opinion of the Stoicks, that say, How that for our sakes the World was made for all things that are, and the World doth by it self generate, are accommodated to the Advantage of Man.

Ib. Seneca de Benef. cap. 23.

‘The Gods were not carelesse or unconcern’d in the making of Man, for whom they made so many other Creatures: For Nature design’d us, and drew us out in Idea before she made us.

Ib. Cicero 2. De Nat. Deorum.

‘And for whose sake then was the World made? For those Beings that have Reason and Intelligence *viz.* Gods and Men, then whom no Being is more excellent.

P. 43. Piso in Medicina Brasili. Lib. 1.

‘It is observable, That so many excellent Trees, Shrubs, and an innumerable company of Herbs, some few excepted, should all appear so unlike the Vegetables of the Antiently known World, both in Figure, Leaf, and Fruits: And the same Observation is made of Birds, Beasts, and Fishes; and of Insects both Flying and Creeping, which are monstrously numerous,

‘numerous, and of unspeakable Beauty in Colour, some known
 ‘to us, and some unknown.

P. 47. *Piso*, ib. “You can scarce determine, whether in
 ‘these Countries there are found more Poisons or Anti-
 ‘dotes: The Leaves, Flowers, and Fruits of the Herbs
 ‘*Tangarack* and *Fuquer*, the two most potent Venoms of
 ‘*Brasil*, each of these hath its proper Root for an oppo-
 ‘site Antidote The *Barbarians* apply the Fat and Heads
 ‘of Vipers, and the whole Bodies of those Insects, prepared
 ‘according to Art, that stung or stuck any Person, and thar
 ‘with boldnesse, and happy successe, to the Wounds made
 ‘by them, and so by the effects do attempt to prove, That
 ‘in every Venom its own Antidote is contained.

P. 49. *Piso*, ib.

‘From the Root *Mandihoca*, that abounds with a very po-
 ‘tent Poison, there is made not onely excellent Aliment, but
 ‘even Antidote too.

P. 50. *Ex Augustino*.

‘You ought not to use your Eyes as a Bruit, onely to take
 ‘notice of Provisions for your Belly, and not for your Mind:
 ‘Use them as a Man: Pry up into Heaven: See the things
 ‘made, and enquire the Maker: Look upon those things you
 ‘can see, and seek after Him whom you cannot see, and believe
 ‘on Him you cannot see, because of those things you see: And
 ‘be not like the Horse and Mule, &c.

P. 75. *Epicurus in Epist: ad Herod: in Laertio*.

‘As to the Meteors, you ought not to believe that there
 ‘is either Motion, or Change, or Eclipse, or the rise or
 setting

Pag. 77. *Aristot. Metaph. 12. c. 6.*

‘How shall things be mov’d if there be no actual cause: For Matter cannot move it self, but requires to be mov’d by a ‘*Telſonic*’ thing-creating Power.

P. 78. *Ciceronis de Thalete.*

‘He ſaid, Water was the Principle of all things, but God was that Intelligence, that made all things out of Water: ‘*Ejuſdem de Anaxagoræ*: The delineation and manner of all things he thought to be design’d and made by the power and reason of an infinite Intelligence.

P. 80. *Garcias ab Horto, L. I. ſimp. c. 47.*

‘Diamonds, which ought to be brought to perfection in the deepeſt Bowels of the Earth, and in a long tract of Time, are almoſt at the top of the Ground, and in three or four Years ſpace made perfect: For if you dig this Year but the depth of a Cubit, you will find Diamonds; and after two Years dig there, you will find Diamonds again.

P. 93. *Ariſt. de Mundo, cap. 6.*

‘It remains that we ſpeak briefly concerning that Cauſe, whoſe Power preſerves and ſupports all things, in like manner, as we have compendiouſly handled other matters: For it would ſeem criminal to paſs over the chief part of the World untouch’d, having design’d to diſcourſe of the Univerſe in a Treatiſe, which, if leſſe accurate, yet certainly may be ſufficient for a rough platform of Doctrin.

ibid.

‘For God is both the Preſerver of all things contain’d in the Univerſe, and likewiſe the Producer of every thing whatſoever which is any wiſe made in this World: Yet not ſo as to be ſenſible of labour, after the manner of a Workman, or a Creature, which is ſubject to wearineſſe; for he is indued with a power which is inferior to no difficulty, and

R

‘whereby

whereby he contains all things under his authority, even such as seem most distant from him.

'Tis more magnificent and agreeable to conceive God, so resident in the Highest Place, that neverthelesse his Divine Energy being diffus'd throughout the whole World, moves both the Sun and Moon, turns round the whole Globe of Heaven, and affords the causes of Safety and Preservation of such things as are upon the Earth.

But to sum up all in brief; what the Pilot is in a Ship; what the Driver in a Chariot; what the chief Singer is in a Dance: finally, what Magistracy is in a Commonwealth, and the General in an Army, That is God in the World: Unless there be this difference, That much toil and manifold cares perplex them; but all things are perform'd by God without labour or trouble.

P. 98. Galen. de Plac. Hipp. & Plat. Lib. 7.

Whereas therefore (saith he) all Men ascribe that to Art, which is made aright in all respects; but that which is so only in one or two, not to Art, but Fortune: The structure of our Body gives us cause to admire the excellent Art, exactnesse and power of Nature which fram'd us: For our Body consists of above Two hundred Bones; to each of which tends a Vein for conveying of nourishment (in like manner as to the Muscles) which is accompanied with an Artery and a Nerve; and the parts are exactly pairs, and those plac'd in the right side of an Animal, are wholly alike to those in the other, Bone to Bone, Muscle to Muscle, Vein to Vein, Artery to Artery, and Nerve to Nerve; excepting onely the Bowels, and some other parts, which seem to have a peculiar construction. So that the parts of our Body are double, and altogether alike among themselves, both in greatness and shape, as also in consistence, which I place in the

'the diversity of softnesse and hardnesse. As therefore we use
'to judg of things made by Men, acknowledging the skill
'of a Work-man, by the building of a Ship with extraordinary
Art; so also it behoveth to do in those of God, and to admire
the Framer of our Body, whosoever of the Gods he were, al-
though we do not see Him.

P. 101. *Arist. de Mundo, Cap. 6.*

'Tis an ancient Tradition (saith he) diffus'd amongst all
'Mankind from our Ancestors, That all things were made
'and produc'd of God, and by God; and that no Nature can
'be sufficiently furnish'd for its own safety, which is left with-
out the support of God, to its own protection.

P. *Ead.*

'Thus therefore we ought to conceive of God; If we con-
'sider His Power, He is Omnipotent; if His Shape, most
'Beautiful; if His Life, Immortal; and finally, if His Vir-
'tue, most Excellent. Wherefore though undiscernable by
'any corruptible Nature, yet He is perceiv'd by such, in
'His Works; and indeed those things which are pro-
'duc'd in the Air, by any mutation whatsoever; in the Earth, or
'in the Water, we ought deservedly to term the Works of
God; which God is the absolute and soveraign Lord of the
World, and out of whom (as saith *Empedocles* the Naturalist)

*All things beginning have, which e're shall be,
Are present or to come, Plants, Men and Beasts,
And Fowl, and Fish the off-spring of the Sea.*

Pag. 102. *Arist. de Mundo, Cap. 6.*

'Tis reported, That when *Phidias*, the excellent Statuary,
'made the Image of *Minerva*, which is in the Castle at A-
'thens, he contriv'd his own Picture in the middle of her
R 2 shield,

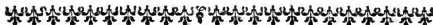
‘ Shield, and fastned the Eyes of it to the Statue by so cunning
 ‘ Workmanship, that if any one were minded to take it away,
 ‘ he could not do it without breaking the Statue, and disorder-
 ‘ ing the connection of the Work. After the same manner is
 ‘ God in the World, retaining and upholding the coherence
 ‘ of all things, and preserving the safety of the Universe:
 ‘ Onely, He is not in the midst of it (namely the Earth) which is
 ‘ a turbulent Region, but in the highest place, which is futable
 ‘ to His Purity.

P. 103, 104. *Galen de Usu partium.*

‘ Our most wise Creator hath plac’d under the Foot a skin,
 ‘ not loose, or thin, or soft, but close, and of indifferent
 ‘ hardnesse and sense, to the end it might not easily suffer injury.
 ‘ To Him I compose these Commentaries as certain Hymns,
 ‘ esteeming Piety not to consist in Sacrificing many *Hecatombs*
 ‘ of Oxen to Him, or burning *Cassia*, and a thousand other
 ‘ Perfumes; but in this, first to know my self, and then to
 ‘ declare to others, what His Wisdome, Power, Providence
 ‘ and Goodness is: the ignorance of which, not the abstaining
 ‘ from Sacrifice, is the greatest Impiety. For I account it an
 ‘ evidence of most perfect goodnesse, that He hath furnish’d all
 ‘ things with convenient ornament, and deny’d His benefits
 ‘ to none. Now, to have devis’d how all things might be
 ‘ handfomly fram’d, is the part of highest Wisdome; but to
 ‘ have made all things which he would, of insuperable Power.

P. 104. *Paracelsus de Minerali Tract. 1.*

‘ God is very admirable in His Works; from the Contem-
 ‘ plation of which we ought not to desist Night or Day, but
 ‘ continually be employ’d in the inquisition of them. *For this*
 ‘ *is to walk in the wayes of God.*



The

123

The INDEX to the First Part.

E S S A Y I.

Of the Usefulnesse of Experimental
Philosophy, principally as it re-
lates to the Mind of Man.

THe reason why the Author endeavours to possess Pyrophilus with the true value of Experimental Philosophy. 1

That Experimental Philosophy is conducive to the improving of man's Understanding, and to the increasing of man's power. 2

Arguments to prove that Man's Curiosity for Knowledge is much thereby gratified. ibid.

A relation of the transport and surprisal of a Maid born blind; when being about 18 years old she obtained the first sight of the various Objects this World presented her with. 3

That the knowledge of the inward Architecture and contrivances of Nature is more delightful than the sight of the outward shapes. 4

Examples and Instances of the prevalence of the pleasure that arises from the attainment of Knowledge. 4

That the knowledge of the most curious Artificial works is not more delightful than the knowledge of Natural. 5. That the delight herein is altogether inoffensive. 6

Instances of the Esteem diverse ancient Philosophers had for it. 6, 7. How this study consists with Religion. 8

The absurdity of not employing humane faculties on the contemplation of those Objects to which they are fitted. 9. Illustrated by the similitude of a Spider in a Palace, taking notice of nothing besides her own Cobweb. 10

The Opinions that Seth Abraham, Solomon, Ovid had of man's fitness for the study of Astronomy, and other Physiology. 11

Why Providence might deprive us of Solomons Physiology. ib.

Of the delight that may arise from the variety of Objects which Nature produceth. 12

That there be above 6000 Subjects of the Vegetable Kingdom. ib.

Of an excellent Jamaica Pepper newly brought over. ib.

Of diverse single subjects that require large Treatises to unfold them. 13.

How many Treatises are already made of Antimony, which yet hath not been perfectly discovered. 13

Of a real Mercury of Antimony. 14. and a real combustible Sulphur of Antimony, that burns like ordinary Brimstone. 14

A new Tincture of Antimonial Glass, with the entire process to draw it. 14

Of Gilbertus, Cabeus, and Kircher, who successively writ the Experiment of the Lonestone. 15

Of some new Experiments hitherto undiscovered of that Stone. ib.

That admirable speculations may arise from the most despicable productions of Nature. 16, 17

What ever God has thought worthy of making, man should not think unworthy of knowing. 18, 19.

Of the Dominion and Power that Physiology gives the prosperous students of it 20, 21

E S S A Y. II.

Of the same.

That the Knowledge of Nature excites and cherishes Devotion. 22. The

The I N D E X.

- The Ends of God's Creation, his own Glory.* 22, 23
- That Man's Good is a second End, proved by Scripture.* 24. *The same proved by Reason and authority.* 25, 26, 27
- How the Sun [Shemesh] is the great minister of the Universe.* 26.
- That accommodation and delight which the Creatures might afford Man is much impaired by the want of Natural Philosophy.* 28
- That the instructions to our Intellectual parts are more considerable than the accommodations we have from Nature to our Animal parts.* ib.
- Of the Hints of Natural Philosophy in the History of the Creation, and other references to it in other places.* 29, 30.
- How God's Power is conspicuous in the Creatures.* 31, 32, 33. *How God's wisdom is conspicuous in them.* ib.
- Particular Observations of the structure of Humane Body.* 34.
- Of the eyes and feet of Moles.* 35
- Of the Silk-worms.* 36. *That it worketh by Instinct and not by Imitation.* 36, 37.
- Of the vastness of the Elephant, and its disproportion to the ass, and such like Mites.* 38, 39.
- Of the vastness of the Whale, and its disproportion to the small Worms or Fishes lately discovered in Viniger.* 40, 41.
- How God's Goodness is conspicuous in his Creatures, by his provision of accommodations for them all; but especially for his Favorite, Man.* 42, 43, 44
- Of the unknown and new detested Properties and Vertues of diverse Concretes.* 44.
- Of the Peruvian Bark, commonly called the Jesuits Powder, of the Use of Paranychia sol. rutaceo in the Kings evil, and of diverse other Concretes observable for their unknown Properties.* 45.
- Of the use of diverse noxious Concretes, and that they contain their own Antidotes.* 46, 47.
- Of that Excellent West-Indian Root Mandihoca.* 47.
- How we are by the Creatures instructed to Devotion.* 48, 49, 50.

E S S A Y. III.

Containing a continuation of the same.

That their Opinion who would deterre men from the scrutiny of Nature tends to defeat God of much of that Glory Man should ascribe unto him. 51, 52, 53

That Philosophers of all Religions have considered the World under the notion of God's Temple. 54

That in this Temple Man must be the Priest. 55, 56.

The contemplation of Gods mercy ought not so to ingrosse our thoughts, as to make us neglect the Glory of his Power and Wisdom. 57

That the study of Physiology is not apt to make men Atheists. 58. *Prov'd further from the ancient Institution of the Sabbath.* 59.

That Physiology cannot explicate by second causes all the Phenomena of Nature, so as to exclude the first. 61. *Prov'd by the Instance of the unknown nature of Mercury, &c.* 62.

E S S A Y. IIII.

Containing a requisite Digression concerning those who would exclude the Deity from intermeddling with Matter.

That some of the Peripatetick Sect are guilty of this error. 63. *That their Hypothesis is very full of mistakes.* 64

That

The INDEX:

That these excluders of the Deity make but imperfect explications of the Phenomena of Nature. *ib.* And does explain the Scale of Causes to the last Cause. 65.

Instances of things wherein their account is not satisfactory. 66. as 1. In the particulars, the causes of which they assign Occult Qualities. *ib.* 2. when they assign Nature's abhorrency of Vacuity to be the cause that Water doth ascend in Suction. *ib.* whereas the contrary is proved in the Suction of Quick-silver. 67. 3. When they assign the causes of the Purgationes Menstruæ 67, 68. And when in other cases they ascribe to irrational Creatures such actions as in men are the production of reason and Choice. 68

The Author's conceits concerning God's Creation of the parts of the World, and so placing them, that they (by the assistance of his ordinary concurrence) must needs exhibit these Phenomena. 69. Illustrated by the Clock at Stratsburg. *ib.*

How far such borrowed and Metaphorical Phrases, which Custome has authorized, may be used. 70

Quick-silver being heavier then Stones, they swim thereon, yet sink in lighter liquors. 70.

That the Instances of the Actions of divers Creatures resembling Reason commend the Wisdom of God. 71, 72.

D feels in the Explication of Nature by the Epicureans, who deny the concurrence of God. 73, 74, 75, 76.

That the figures in Nitre, Chryttal, and divers Minerals are produced not by chance, but by somewhat Analogous to seminal principles. 77

That the Generation of Animals is much lesse to be accounted the production of Chance. 78

That the Hypotheses of Philosophy only

show that an effect may be produced by such a cause, not that it mult. 79

That to a perfect Knowledge there must not only appear the possible, but the definite and real, not only the general, but the particular causes. 80.

Some defects in the waies of Reasoning used by the most eminent Atomists. 81, 82, 83.

The most plausible argument of the Opposers of a Deity considered. 84, 85, 86, 87;

E S S A Y. V.

Wherein the Discourse interrupted by the late Digression is resumed and concluded.

That there are some things in Nature which conduce much to the evincing of a Deity, which are only known to Naturalists. 89 Explain'd by the comparison of the Uniting scatter'd pieces of Paint into one face by a Cylindrical Looking Glass. 90. The Testimony of the Author of the Book De Mundo ascribed to Aristotle introduced. *ib.*

Of the admirable contrivance of the Make of the Musculus Marsupialis. 92. and of the parts of the Hand. *ib.*

The contrivance for the Circulation of the Blood in a Foetus before the use of Respiration. 93

Galen's Speech, That his Books De Ulu Partium were as Hymns to the Creator. *ib.*

The Fabrick of the Eye considered. *ib.*

Some Experimental Observations of the Eye, and the use of its parts in order to Vision. 94.

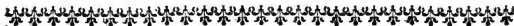
The way to prepare the Eyes of Animals for the better making Observations on them. *ib.*

Some particulars wherein the Eyes of white Rabbits are better then others for Observation. 95

That it is dishonourable for the Soul to be unacquainted

The INDEX.

- unacquainted with the exquisite structure of the Body, being its own Mansion. 95. Proved out of Instances in the Psalmist and Galen. ib.
- Why the anterior part of Fishes Eyes ought to be more Spherical than those of men. 97.
- That God made Man not after the World's Image, but his Own. 98.
- That the Image of God on us should engage us to esteem our selves as belonging to God. ib.
- Arguments from Authority, and the Experience of all Ages, That the Contemplation of the World has adduced Man to the Reverence of God. 98.
- That those People who worship not God, are not Naturalists but Barbarians, and that their Atheisme doth continue for want of the Contemplation of the World. 99.
- A comparison of the Image of God on the Creature, to that of Phidias on Minerva's Shield. 100.
- The noblest worship that has been paid to God from such who have not had particular Revelation of his will, has arose from the speculation of God's Wisdom, Power, and Goodness in the fabrick of the Creature. 103. The Testimonies of Galen, Hermes, Paracellus, I. Bacon. 102.
- That Religion has other Arguments besides those drawn from the works of Nature, enough to keep any considering man from Atheism. 104.
- That the Difficulty of conceiving the Eternity, Self-Existence, and other Attributes of one God, is lesse then to conceive infinite, eternal, self-existent, and self-moving Atomes. 106.
- As God is infinitely better then all his Creatures, so the Knowledge of him is better then the Knowledge of his Creatures. 108.
- The Imperfection and Disquiet that there is in humane Science. 108, 109.
- How the Favour of God conduces to promote mens Proficiency in the study of Nature. 110.
- The Reason of the Authors so long Discourse on this Subject. 112.
- Beasts inhabit and enjoy the World, 'tis Man's duty to Spiritualize it. 113.
- That is being the prime Duty of Man to give God the Honour of his Creatures, is to be preferr'd before secondary Duties. ib.
- That the different greatness in the Knowledge make a like difference in the Honour given to the Creator. 115.
- God, by becoming our Saviour, has not laid aside the Relation of a Creator. ib.
- That he who sacrificeth Praise, honoureth God. ib.
- The Conclusion. 116.



115

OF THE
USEFULNESSE
OF
Natural Philosophy.

The Second Part.

The first SECTION.
Of its Usefulness to PHYSICK.

THE





ESSAY I.

*Containing some Particulars tending to shew
the Usefulness of Natural Philosophy to
the Physiological part of Physick.*



After having, in the former part of this Treatise, *Pyrophilus*, thus largely endeavoured to manifest to you the advantageousness of Naturall Philosophy to the mind of Man, we shall now proceed to speake of its Usefulness, both to his Body and Fortune. For

I must ingeniously confesse to you, *Pyrophilus*, That I should not have neer so high a value as I now cherish for Physiology, if I thought it could onely teach a Man to discourse of Nature, but not at all to master Her; and served onely, with pleasing Speculations, to entertaine his Understanding without at all increasing his Power. And though I presume not to judge of other Mens knowledge: yet, for my owne particular, I shall not dare to thinke my selfe a true Naturalist, till my skill can make my Garden yeeld better Herbs and Flowers, or my Orchard better Fruit, or my Field better Corne, or my Dairy better Cheese than theirs that are strangers to Physiology. And certainly, *Pyrophilus*, if we seriously intend to convince the distrustfull World of the reall usefulness of Naturall Philosophy, we must take some such course, as that *Milesian Thales* did, who was by the Anti-

The advantage of the knowledge of nature towards the increasing the power of Man; and its use as to health of the Body & Goods of fortune.

ents reckoned among the very first of their Naturalists, and their seven celebrated Wise-men : Of this *Thales* it is reported, That being upbraidingly demanded what advantage the Professors of Astrology could derive from the knowledge of it, he Astrologically foreseeing what a Yeare it would prove for Olives, before any wonted signes of it did appear to Husbandmen, Ingrossed, by giving earnest, the greater part of the Olives, which the next Season should afford to *Chios* and *Miletus*, And being thereby enabled, when most Men wanted Oyle, to sell his at his owne rates, he made advantage enough of his skill, to let his friends see, That Philosophers may have the acquisition of Wealth more in their power than in their aime.

That in Mans knowledge of the nature of Creatures consists his empire over them.

Me thinks, it should be a disparagement to a Philosopher, when he descends to consider Husbandry, not to be able, with all his Science, to improve the precepts of an Art, resulting from the lame and unlearned Observations and Practice of such illiterate persons as Gardeners, Plow-men, and Milk-maids. And indeed, *Pyrophilus*, though it be but too evident, that the barren Philosophy, wont to be taught in the Schooles, hath hitherto beene found of very little use in humane life; yet if the true principles of that fertill Science were thoroughly knowne, consider'd and apply'd, 'tis scarce imaginable, how universall and advantageous a change they would make in the world. For in Mans knowledge of the nature of the Creatures, doth principally consist his Empire over them, (his Knowledge and his power having generally the same limits.) And as the Nerves, that move the whole Body, and by it, that great variety of Engines imployed by Man on his manifold occasions, proceed from the Braine; so all the operations, by which we alter Nature and produce such changes in the Creatures, flow from our knowledge of them. Theologicall inquiries excepted, there is no Imployment wherein Mankind is so much and so generally concerned, as 'tis

'tis in the study of Naturall Philosophy. And those great Transactions which make such a noise in the World, and establish Monarchies or ruine Empires, reach not to so many persons with their influence, as do the Theories of Physiology.

To manifest this Truth, we need but consider, what changes in the Face of things have been made by two Discoveries, trivially enough; the one being but of the inclination of the Needle, touched by the Load-stone, to point toward the Pole; the other being but a casual Discovery of the supposed antipathy between Salt-peter and Brimstone: For without the knowledge of the former, those vast Regions of *America*, and all the Treasures of Gold, Silver, and Precious Stones, and much more Precious Simples they send us, would have probably continued undetected; And the latter giving an occasionall rise to the invention of Gunpowder, hath quite altered the condition of Martiall affaires over the World, both by Sea and Land. And certainly, true Naturall Philosophy is so far from being a barren speculative Knowledge, that Physick, Husbandry, and very many Trades (as those of Tanners, Dyers, Brewers, Founders, &c.) are but Corollaries or Applications of some few Theorems of it.

If I had not a great respect for the Great *Hippocrates*, I should venture to say, That some of those rigid Lawes of *Draco* (whose severity made Men say, That they were written in Blood) have, perhaps, cost fewer persons their lives, then that one Aphorisme of *Hippocrates*, which teaching, *That if a seeming Woman be let Blood, she will miscarry*, has for divers Ages prevailed with great numbers of Physitians, to suffer multitudes of their Female patients to die under their hands, who might probably have been rescued by a discreet Phlebotomy, which experience hath assured us (whatever the close of * the Aphorisme sayes to the contrary) to have been sometimes not onely safely, but usefully employed, even when the Infant

That the discovery of *America* is owed to the knowledge of the Loadstones polarity,

That the Martiall affaires all over the World were altered by the knowledge of the nature of Brimstone and Saltpeter.

How prejudicial the mistake of that Aphorisme (that if seeming women be let blood they will miscarry) hath been to female patients.

* Hipp. Aph. 31. lib. 5. *Τὸν ἐν γαστρὶ ὄντα, φασὶν ὅτι μὴ θνήσκει, ἐὰν αἵματι ἐκείνην ἀφαιρήσῃς.*
 31. lib. 5. *Ton en gastri onta, phasin oti mē thnēskēi, ean aimati ekeinēn aphairehēsēi.*

is grown pretty bigge. But my respect for so great a Person as *Hippocrates*, makes me content it should be thought, That till of late, Physicians have for the most part mistaken their Dictators meaning in this Aphorisme, provided it be granted me, That through this mistake numbers of teeming Women have been suffered to perish, who might probably, by the seasonable loss of some of their Blood, have prevented that of their Lives.

And if an Error, which occasioned onely a fault of omission, hath been so prejudiciall to Man-kinde, I suppose you will readily grant that those Errors of Physicians, that are apt to produce faults of commission, and rash attempts, may prove much more hurtfull. And so much I finde to be acknowledged by *Galen*, in that honest and excellent passage of his, in his Comment upon the Aphorismes, where having mentioned the danger of trying conclusions upon Men, by reason of the noblenesse of the Subject; and having added, That the Physicians Art is not like that of a Potter, a Carpenter, or the like, where a Man may freely try what he pleases to gratifie his curiosity, or satisfie himselfe about his Notions, because that if he spoyles (for instance) the Wood he workes on, no Body is endangered by his miscarriage: He thus concludes, *In corpore autem Humano ca tentare, quæ non sunt experientium comprobata periculo non vacat; cum temeraria experientia finis sit totius Animantis internecio.*

Comment. in
Aph. 1. lib. 1.

The interest of
this knowledge
to the happi-
nesse and life
of Man,

And indeed, since the Physician borrows his Principles of the Naturalist, I cannot but somewhat admire to see diverse Persons, who are by themselves and others thought such wise Men, thinke the study of Naturall Philosophy of small concernment: for when by their Policy or good Fortune they have acquired never so much Wealth or Power, and all other transitory Goods, and are blest with Children to inherit them, if the Principles of Natural Philosophy be mis-laid, we oftentimes see the ignorance or the mistake of a Doctor, deprive them

them of all at once, and shew how dangerous it is to be solicitous of the means of attaining the accommodations of Life, with the contempt of that Knowledge which in very many cases is humanely necessary to the preservation of Life it self.

But, *Pyrophilus*, though our unintended prolixity in the former part of our Discourse concerning the Usefulness of Physiology, oblige us to the greater brevity in this latter part of it; yet to shew you, That of the two things, which you may remember we told you *Pythagoras* pronounced most God-like in Man (*The Knowledge of Truth, and the Doing of Good.*) Physiology as well qualifies us for the latter, as it enriches us with the former. It will not be amiss a little more particularly (though as succinctly as so copious a Subject will permit) to consider the probability there is that no small Improvement may be made by Mens proficiency in Experimental Knowledge of those Arts which are the chiefest Instruments of Mans dominion over the Creatures. These Arts (to divide them not accurately, but popularly) do serve either to relieve Mans necessities, as Physick and Husbandry; or for his accommodation, as the Trades of Shoo-makers, Diers, Tanners, &c. or for his delight, as the Trades of Painters, Confectioners, Perfumers, &c. to all which Arts, and many others ally'd to them, Philosophical Experiments and Observations, may, by a knowing Naturalist, be made to extend a meliorating Influence.

If I should, *Pyrophilus*, say this, without offering any thing at all by way of Proof that I say it not inconsiderately, You would, I fear, believe, that I deliver it too slightly for a Matter of that Moment: And if, on the other side, I should in this Discourse present to you all the particulars that I think I could without Impertinency, employ to countenance what I have said, it would swell this Treatise to a Volumn, and defraud divers of my other Essays. And therefore I hold it not unfit

The enumeration of those Arts to which this knowledge is profitable.

The method or way intended for the ensuing discourse.

unfit to choose a middle way, and set down, on this occasion; either only or chiefly those things which do the most readily occur to me, and do not so properly belong to the rest of my Physiological Papers. And to avoid Confusion, I shall, according to the Division newly proposed, employ one Section of this second part of the present Treatise, in setting down such things as relate to the improvement of Physick. And in the other Section, deliver such particulars as concern those other useful Arts that depend upon Natural Philosophy. But in regard that (as I have already intimated) the following Discourse is to consist chiefly of those things that belong not to any of my other Essays, You will not, I presume, expect that I should handle any subject fully or Methodically on this occasion: Which warning I especially intend for that part of the ensuing Discourse that relates to Physick. For you will easily believe, that I am far from pretending to be a Doctor in that Faculty: And accordingly, in this and the four following Essays, I shall only throw together divers such particulars as not belonging to my Writings, would, perhaps be lost, if I did not lay hold on this Opportunity for their preservation, of which they are not altogether judged unworthy by some knowing Men, whose encouragements, to mention them to you, have dissuaded me from wholly passing by, in this Discourse Matters properly Medical, what scruples soever I had to venture at speaking of them, Especially since I have not now the Conveniency to furnish these Essays with divers particulars (by some thought not inconsiderable) which I may, perhaps be invited to add to them hereafter, if I finde by your Reception of these that the others are like to be welcome.

The division of
Physick in five
parts.

To say something then of Physick, and to suppose the fitness of the now received division of it into five parts: The Physiologicall (the Physitian taking that in a stricter sense than Philosophers, and then we do every where, save in this Essay)
Patholo-

Pathological, Semeiotical, Hygieinal, and Therapeutical, let us briefly take notice how each of these is indebted to, or capable of being improved by experienc'd Naturalists. And indeed, such is the affinity between Natural Philosophy and Physick, or the dependance of this on that, that we need not wonder at the judicious Observation of *Aristotle*, where he thus writes, *Naturalium ferè plurimis & Medicorum, qui magis Philosophicè artem prosequuntur, illi quidem finiunt ad ea, qua de Medicina; hi verò ex iis qua de Natura, incipiunt qua de Medicina.* But we must instance these things more particularly: And first for Physiology, 'tis apparent, That the Physician takes much of his Doctrine in that part of his Art from the Naturalist: And to mention now no other parts of Physiology, in its stricter acception, the experience of our own age may suffice to manifest, what light the Anatomical doctrine of Mans Body may receive from Experiments made on other subject. For since it were too barbarous, and too great a violation of the Laws, not only of Divinity but Humanity, to dissect humane Bodies alive, as did *Herophilus* and *Erasistratus*, who (as I finde in some of the Ancients) obtained of Kings the Bodies of Malefactors for that purpose, and scrupled not to destroy Man to know him; And since, nevertheless divers things in Anatomy, as particularly the motion of the Blood and Chyle cannot be discovered in a dead dissected Body (where the cold hath shut up and obliterated many Passages) that may be seen in one opened alive; it must be very advantageous to a Physicians Anatomical knowledge, to see the Dissections of Dogs, Swine, and other live Creatures, made by an inquisitive Naturalist: Consonantly whereunto we may remember, that the discoveries of the milky Vessels in the Mesentery by *Asellius*, of those in the *Thorax* by *Pecquet*, and of the *Vasa Lymphatica* by *Bartholinus*, were first made in Brute Bodies, though afterwards found to hold in humane

Arist. lib. de sensu & sens. filii, cap. 1.

How the Physiological part of Physick is advantaged by the knowledge of natural Philosophy.

That the Anatomical doctrine of mans body receives light from experiments made on other creatures.

Proved by divers instances: as of the finding the lacteals and lymphaticks in brute bodies first.

humane ones. Nor is it a small convenience to the Anatomist, that he may in the Bodies of Brutes make divers instructive Experiments, that he dares not venture on in those of Men; as for instance, that late noble, and by many not yet credited Experiment of taking out the Spleen of a Dog without killing him: For that this Experiment may be very useful, we may elsewhere have occasion to shew. And that it is possible to be safely made (though many, I confess, have but unprosperously attempted it, and it hath been lately pronounced impossible in Print) our selves can witness. And because I have not yet met with any Author that professes himself not to relate this Experiment (of the exemption of a Dogs Spleen) upon the credit of others, but as an eye-witness; I am content to assure you, That that dextrous Dissector, Dr *Felive* (of whom we formerly made mention) did the last Year, at my request, take out the Spleen of a young Setting-dog I brought him: And that it might not be pretended, the Experiment was unfaithfully or favourably made, I did part of it myself, and held the Spleen (which was the largest in proportion to his Body that ever I saw) in my Hand, whilst he cut asunder the Vessels, reaching to it, that I might be sure there was not the least part of the Spleen left unextirpated, and yet this Puppy, in less than a Fortnight, grew not only well, but as sportive and as wanton as before: which I need not take pains to make you believe, since you often saw him at your Mothers House, whence at length he was stoln. And though I remember the famous Emperick *Fioravanti*, in one of his *Italian* Books, mentions his having been prevailed with by the importunity of a Lady (whom he calls *Marulla Greca*) much afflicted with Splenetick distempers, to rid her of her Spleen; and adds, That she out-lived the loss of it divers Years. Yet he that considers the situation of that part, and the considerableness of the Vessels belonging to it in humane Bodies, will probably

The Experiment of taking out the Spleen in Dogs.

The same thing done by Fioravanti in a Woman.

probably be apt to think, that though his relation may be credited, his venturousness ought not to be imitated. The Experiment also of detaining Frogs under Water for very many hours (sometimes amounting to some dayes) without suffocation, may, to him that knows that Frogs have Lungs and Breath as well as other Terrestrial Animals, appear a considerable discovery, in order to the determining the Nature of Respiration. Besides, the scrupulousness of the Parents or Friends of the deceased Persons, deprives us oftentimes of the Opportunities of Anatomizing the Bodies of men, and much more those of Women, whereas those of Beasts are almost alwayes and every where to be met with. And 'twas, perhaps, upon some such account, that *Aristotle* said that the external parts of the Body were best known in Men, the internal in Beasts, *Sunt enim* (sayes * he, speaking of the inward parts) *hominum imprimis incerta atque incognita: quoniam ad ceterorum animalium partes quarum similes sunt humanae referentes eas contemplari debemus.* And questionless in many of them, the frame of the parts is so like that of those answerable in men, that he that is but moderately skill'd in Andratomy (as some of the Moderns call the Dissection of Mans Body, to distinguish it from Zootomy, as they name the Dissections of the Bodies of other Animals) may, with due diligence and industry, not despicably; improve his Anatomical knowledge. In confirmation of which truth, give me leave to observe to you, That though *Galen* hath left to us so many, and by Physicians so much magnified Anatomical Treatises, yet not only divers of those Modern Physicians, that would eclipse his Glory, deny him to have learn'd the skill he pretends to, out of the inspection of the Dissected Bodies of Men or Women, or so much as to ever have seen a humane Anatomy. But I finde even among his Admirers, Physicians that acknowledge that his Knives were much more con-

The respiration of Frogs divers hours, sometimes dayes, under water, without suffocation.

* *Arist. Hist. lib. 1. cap. 16.*

What use *Aristotle* and *Galen* made of the dissections of Brutes.

Anatomy of
Man counted
now in Mus-
covy for inhu-
manes; And the
use of Skele-
tons for Witch-
craft.

Voyage de
Muscovie &
de Perse, pag.
128.

The use of the
comparison of
the parts of
humane Body
with those of
Beasts;

Illustrated by
divers particu-
lar Observati-
ons.

versant with the Bodies of Apes, and other Brutes, then with those of Men, which in his time those Authors say 'twas thought little less than Irreligious, if not Barbarous, to man-
gle; which is the lesse to be wondred at, because even in this our Age, that great People of the Muscovites, though a Christian and European Nation, hath deny'd Physicians the use of Anatomy and Skeletons; the former, as an inhumane thing; the latter, as fit for little but Witchcraft, as we are informed by the applauded Writer *Olearius*, Secretary to the Embassy lately sent by that Learned Prince, the present Duke of *Holsteine*, into *Moscovia* and *Persia*. And of this, the same Author gives us the instance of one *Quirin*, an excellent German Chyrurgion, who, for having been found with a Skeleton, had much adoe to scape with his Life, and was commanded to go out of the Kingdome, leaving behind him his Skeleton, which was also dragged about, and afterwards burnt.

To these things we may adde, *Pyrophilus*, that the diligence of Zootomists may much contribute to illustrate the Doctrine of *Andratomy*, and both inform Physicians of the true use of the parts of a humane Body, and help to decide divers Anatomical Controversies. For as in general 'tis scarce possible to learn the true Nature of any Creature, from the consideration of the single Creature it self: so particularly of divers parts of a humane Body 'tis very difficult to learn the true use, without consulting the Bodies of other Animals, wherein the part inquired after is by Nature either wholly left out as needless, or wherein its differing bigness, or situation, or figure, or connection with, and relation to other parts, may render its use more conspicuous, or at least more discernable.

This Truth may be somewhat illustrated by the following Observations, which at present offer, themselves to my thoughts upon this occasion.

The Lungs of Vipers, and other Creatures (whose Hearts
and

and whose Blood, even whilst it circulates, we have always found, as to sense, actually cold) may give us just occasion to inquire a little more warily whether the great use of Respiration be to cool the Heart.

The suddain falling and continuing together, which we may observe in that part at least of a Dogs Lungs, that is on the same side with the Wound, upon making a large Wound in his Chest, though the Lungs remain untouched, is a considerable Experiment, in order to the discovery of the principal Organ of Respiration.

If you dexterously take out the Hearts of Vipers, and of some smaller Fishes, whose coldness makes them beat much more unfrequently and leisurely, then those of warm Animals, the contraction and relaxation of the Fibres of the Heart may be distinctly observed, in order to the deciding or reconciling the Controversie about the cause and manner of the Hearts motion, betwixt those Learned modern Anatomists, that contend, some of them, for Dr. *Harvey's* Opinion; and others, for that of the Cartesians.

Towards satisfying my self in which difficulty, I remember, I have sometimes taken the Heart of a Flownder, and having cut it transversly into two parts, and press'd out, and with a Linnen cloth wip'd off the Blood contain'd in each of them, I observ'd, that for a considerable space of time, the sever'd and bloodless parts held on their former contraction and relaxation. And once I remember that I observed, not without Wonder, That the sever'd portions of a Flownders Heart, did not only, after their Blood was drain'd, move as before, but the whole Heart, observ'd for a pretty while, such a succession of motion in its divided and exsanguious pieces, as I had taken notice of in them whilst they were coherent, and as you may with pleasure both see and feel in the intire Heart of the same Fish.

Some

Some of the other Controversies agitated among Anatomists and Philosophers, concerning the use of the Heart, and concerning the principal seat of Life and Sense, may also receive light from some such Experiments, that we made in the Bodies of Brutes, as we could not of Men.

Divers motions and Actions of Frogs, after their hearts were cut out.

And the first of these that we shall mention, shall be an Experiment that we remember our selves formerly to have made upon Frogs: For having opened one of them alive, and carefully cut out his Heart, without closing up the Orifice of the Wound (which we had made wider then was necessary) the Frog notwithstanding leaped up and down the Room as before, dragging his Entrails (that hung out) after him; and when he rested, would upon a puncture leap again, and being put into the Water, would swim, whilst I felt his Heart beating betwixt my Fingers. The Hearts of others of them were taken out at an Incision, no greater then was requisite for that purpose; when we had stitched or pin'd up the Wound, we observed them to leap more frequently and vigorously then the former: They would, as before they were hurt, close and open their Eye-lids upon occasion: Being put into a Vessel not full of Water, they would as orderly display their fore and hinder Legs in the manner requisite to swimming, as if they wanted none of their parts, especially not their Hearts; they would rest themselves sometimes upon the surface of the Water, sometimes at the bottom of it, and sometimes also they would nimbly leap, first out of the Vessel, and then about the Room, surviving the extraction of their Hearts, some about an hour, and some longer. And that which was further remarkable in this Experiment, was, that we could, by gently pressing their Breast and Belly with our Fingers, make them almost at pleasure make such a noise, as to the By-standers made them seem to croak; but how this Experiment will be reconciled to the Doctrine ascribed to Mr *Hobs*, or to that

that of the *Aristotelians*, who tell us, That their Master taught, the Heart to be the seat of Sense (whence also though erroneously, he made it the original of the Nerves) let those that are pleased to concern themselves to maintain all his Opinions, consider.

And whereas Frogs, though they can move thus long without the Heart, yet they cannot at all bear the exemption or spoiling of the Brain; we will adde what we have observed, even in hot Animals, whose Life is conceived to be much more suddenly dissipable, and the motion of each part much more dependent upon the influence of the Brain: We opened then an Egg, wherein the Chick was not only perfectly formed, but well furnished with Feathers, and having taken him out of the Membrane that involved him, and the Liquors he swam in, and laid him on his Back on a flat piece of Glass, we clip'd away, with a pair of Scissers, the Head and the Brest-bone; whereby the Heart became exposed to view, but remained fastned to the Headless Trunk: and the Chick lying in this posture, the Heart continued to beat above a full hour, and the Ears seemed to retain their motion a pretty while after the Heart it self had lost his; the motion of none of the other Parts appearing many moments to survive the losse of the Head: and which is most considerable, the seemingly dead Heart was divers times excited to new, though quickly ceasing motion, upon the puncture of a Pin, or the point of a Pen-knife. And to evince that this was no casual thing, the next Day we dealt with the Chick of another Egg, taken from the same Hen, after the above recited manner; and when the motion of the Heart and Ears began to cease, we excited it again, by placing the Glass over the warm steam of a Vessel full of hot Water, bringing still new Water from off the Fire to continue the heat, when we perceived the former Water to begin to cool; and by this means we kept the Heart beating
for

Observations
of the Motion
of a Chickens
heart after the
head and
other parts
were cut off;

for an hour and an half by measure. And at another time for further satisfaction, we did, by these and some other little industries, keep the Heart of a somewhat elder Chick, though exposed to the open Air, in motion, after we had carefully clipt off the Head and Neck, for the space of (if our memory do not much mis-inform us) two hours and an half by measure. Upon what conjectures we expected so lasting a motion in the Heart of a Chick, after it had lost the Head, and consequently the Brain, would be more tedious and less fit to be mentioned in this place, then the strange vivacity we have sometimes, not without wonder, observed in Vipers: Since not only their Hearts clearly sever'd from their Bodies may be observ'd to beat for some hours (for that is common with them to divers other cold Animals) but the Body it self may be sometimes two or three days after the Skin, Heart, Head, and all the Entrals are separated from it, seen to move in a twining or wrigling manner: Nay (what is much more) may appear to be manifestly sensible of punctures, being put into a fresh and vivid motion, when it lay still before, upon the being pricked, especially on the Spine or Marrow with a Pin or Needle.

Of the vivacity of dissected Vipers :

And Tortoises.

And though Tortoises be in the Indies many of them very large Animals, yet that great Traveller *Vincent R Blanc*, in his French Voyages, giving a very particular account of those Tortoyse, which the East Indian King of *Pegu* (who was much delighted with them) did, with great curiosity, cherish in his Ponds, addes this memorable Passage as an Eye-witnesse of what he relates: *When the King hath a mind to eat of them, they cut off their heads, and five days after they are prepar'd; and yet after those five days they are alive, as we have often experienc'd.* Now although I will not say, that these Experiments prove, that either 'tis in the Membrane that sensation resides (though I have sometimes doubted whether the Nerves

Nerves themselves be not so sensible, chiefly as they are invested with Membranes) or that the Braine may not be confined to the Head, but may reach into the rest of the Body, after another manner than is wont to be taught: Yet it may be safely affirm'd, that such Experiments as these may be of great concernment, in reference to the common Doctrine of the necessity of unceasing influence from the Braine, being so requisite to Sense and Motion; Especially if to the lately mentioned particulars we adde on this occasion what we have observ'd of the Butter-flies, into which Silk-wormes have been Metamorphos'd; namely, That they may not onely, like common Flies, and divers other winged Insects, survive a pretty while the losse of their Heads, but may sometimes be capable of procreation after having lost them: as I not long since tryed (though not perhaps without such a Reluctancy as Aristotle would have blam'd in a Naturalist) by cutting off the Heads of such Butter-flies of either Sexe. *Quamvis enim Mas cui prius amputatum est caput nequaquam adduci posset (quacunq; Insecti illius est salacitas) ut Faminam comprimeret: Decollata tamen Femina marem alacriter admisit. Et licet post horas aliquot coitu insumpta ita requierit immota ut mortuam per multas horas cogitarem; non solum quia omnem penitus motum perdididerat, & in Thorace satis magnum apparebat foramen, quod à parte aliqua Corporis simul cum capite à trunco disrupta factum videbatur; verum etiam quoniam eodem permansit statu idq; per plures horas, ultra tempus quo post coitionem cum Mare huius generis Animalcula solent ordiri proliferationem. Tandem verò postquam jam diu de Vita ejus desperatum esset, Ova fatate tam confestim capis ut vel exiguo temporis intervallo eorum plura in manu mea deponeret. An verò Prolifica sint futura nondum comperi.*

Whether there be a necessity of the unceasing influence of the brain to sense and motion.

That the Silk-worm-butter-flie is capable of procreation after the losse of its head.

Their Opinion that ascribe the rednesse of the Blood to the colour of the Liver, through which it passes, is not discountenanced

c.

That the red-
ness of the
blood is not to
be ascribed to
the liver, pro-
ved by the in-
spection of the
liver of Chick-
ens unhatched.

tenanced by the Livers of Men: But in Hen-eggs, about the third or fourth day after incubation (for we have found the circumstances of time much to vary) you may observe the *Punctum saliens*, or Heart, to be ever and anon full of conspicuously red Blood, before the naked Eyes can so much as discern a Liver, at least before they can discover in it any redness; a yellowness being all I could observe in the *Parenchyma* of the Livers of divers Chickens perfectly form'd, and furnish'd with Feathers, though not great enough to make their way out of the Shell. And in diverse great Fishes I have found the Vessels of the Liver full of very red Blood, though the *Parenchyma* or substance of it were white, or at least did not at all participate, much less impart a sanguine colour.

That the loss
of a Limb in
all animals is
not irreparable.

The Doctrine so unanimously delivered by Physicians and Chirurgeons, concerning the irreparable loss of the Limb of an animal, once violently severed from the Body, will appear unfit to be admitted, without some restriction, by what may be experienced in Lizards, in Lobsters and Craw-fishes, and perhaps in some other living Creatures. For of Lizards it hath been often observ'd in hot Countries, and even in *France*, that their Tails being struck off will grow againe. And the like hath been of old observ'd by *Pliny*; and the experience of *Bontius* delivers it upon his owne knowledge in these words: *Hoc in domesticis meis non semel animadverti dum filii mei lusi abundi bacillo caudas eis decutiebant, quas tamen post diem unum aut alterum ad solitum pabulum revertentes vidi, caudasque paulatim reaccrescere.*

That the Claws likewise of Lobsters being torne off, another will sometimes grow in the room of it, is not onely said by Fisher-men, but hath been affirmed to me by very credible persons, one of which assured mee, that he himselfe had observed it very often. And I am the more apt to believe it, because the like is to be met with among Craw-fishes, which

which are so like Lobsters, that by many they are taken (though not considerably enough) to be but a smaller kinde of them. For I remember, that going to look upon a Repository where a multitude of them was kept, and causing divers of the fairest to be drawn up, that I might take the stony concretions, commonly called *Oculi Cancrorum*, out of their Heads, I observ'd one large Fish that had one of his Claws proportionable to the bulk of his Body, but the other so short and little, that the greater seem'd to be four or five times as big as it; whereupon its good shape and fresh colour, seeming to argue it to be but young and growing, invited me to ask one of them that had the oversight of the Fish, whether he had formerly seen any Claws torn off to grow again; he affirmed to me, That in that sort of Fish it was very usual.

I could also tell you how fruitlessly I have indeavoured to discover that Stomachical Acidity, to which many of our Modern Physicians are pleased to ascribe the first digestion of the Nutriment of Animals, in the purposely dissected Stomachs of ravenous Sea-fishes, in whose Stomachs though our taste could not perceive any sensible acidity, yet we found in one of them a couple of Fishes, each of them about a Foot long, whereof the one, which seem'd to have been but newly devoured, hath suffered little or no alteration in the great Fishes Stomach; but the other had all its outside, save the Head, uniformly wasted to a pretty depth, beneath the former surface of the Body, and look'd as if it had been not boil'd, or wrought upon by any considerable heat, but uniformly corroded, like a piece of Silver Coyne kept a while in *Aqua fortis*, according to the criminal tricks of Adulterators of Money.

Yet I am loth, till I have perfected what I design in order to that enquiry, either to embrace or reject the Opinion I find so general among the Moderns, concerning the Solution of Meat in the Stomach by something of Acid. And I remem-

That notwithstanding the great solution and digestion of Meat in the Stomachs of Fishes, no sensible Acidity is found there.

Experiments
concerning the
solution of
Meats and their
change of co-
lours by acid
Menstruums.

ber, that when I was considering what might be alledg'd for, as well as against that Opinion, I devised this Experiment, among others, in favour of it: I provided a Liquor, with which I drench'd a piece of a wing of a roasted Pullet, having first well crush'd it between my Fingers, to make some amends for the omission of chewing it; and having a little incorporated the Liquor and the musculous Flesh, they immediately chang'd colour, and in about an hour, grew to be a kind of Gelly, in colour and consistence not unlike Quince Marmalade: This mixture, by the next Morning, did, as I expected, turn to a deep Blood red, or sometimes rather a lovely purple Liquor, though all this while there had been no external heat employ'd to promote the action of the *Menstruum*. And the like Experiment I try'd also with a piece of Mutton, with Bread, and a piece of Veal, and other edible things, which at that time occur'd to me, and found the operation of the Liquor almost uniform, though it seem'd to act most effectually upon Flesh. And to gratifie in some measure your curiosity, *Pyrophilus*, I am content to tell you, that the *Menstruum* was drawn from Vitriol, and that with the bare Oyl of it I have (though I could not with *Aqua fortis*) perform'd no less then what I have yet mention'd; but least this should be thought a digression, let it suffice to have one this occasion, mention'd thus much upon the by.

To what we lately took notice of concerning the Heart, may be added, That on the Sea-coast of *Ireland*, I observ'd a sort of Fishes, about the bigness of Mackrels, whose Hearts were of an inverted Figure, compar'd to those of other Animals, the basis or broad end of the Heart being nearest the Tail, and the acuminate part or apex being coherent to the great Artery, and respecting the Head.

To all these trifling Observations, divers more considerable ones might be added, but they may be more seasonably insist-
ed

ed on elsewhere; and those already mention'd, may suffice to let you see, That the Naturalist by his Zootomy, may be very serviceable to the Physician in his Anatomical Inquiries.

Nor is it only by the dissection of various Animals, that the Naturalist may promote the Anatomists knowledge, but perhaps also he may do it by devising wayes to make the dead Bodies of Men, and other Animals, keep longer then naturally they would do: For since experience teaches us, That Men finde it very easie to forget the originations, windings, branchings, insertions, and other circumstances of particular Vessels, and other parts of the Body, as well as those that study Botanicks, are wont to complain of their easie forgetting the shapes, differences, and alterations of smaller Plants, it cannot but be a great help to the Student of Anatomy, to be able to preserve the parts of humane Bodies, and those of other Animals, especially such Monsters as are of a very singular or instructive Fabrick, so long that he may have recourse to them at pleasure, and contemplate each of them so often and so considerately, till he have taken sufficient notice of the shape, situation, connection, &c. of the Vessel, Bone, or other part, and firmly impressed an *Idea* of it upon his memory. We finde our selves much help'd to retain in our memory, the figures and differences of Vegetables, by those Books which some curious Botanists make, wherein the Plants themselves, artificially dry'd, are display'd upon, and fastned to Leaves of white Paper; if it were not for one of those Books, wherein I have in one vast Volume almost all the Plants of one of the chief Physick-gardens in *Europe*, I should every Year forget, by the end of Winter, to know again most of the smaller Plants I had learn'd to take notice of in the Spring. And by the way 'tis observable, how long Plants, by being carefully indeed, but barely dryed in the shade betwixt Sheets of Paper, which help to soak up the superfluous moisture,

Wayes of Artificial drying
and preservation
of Plants.

may be preserv'd. For I have divers Years had an Herbal, wherein several of the Flowers, and others Plants, retain their native yellow and blue, &c. (but somewhat faint) though by the date it appear'd to be 22 or 23 Years old. And I am apt to think, that it would be very possible for Anatomists also to preserve the Bodies they contemplate for a considerable time: For experience hath inform'd us in good number of such Animals, that Butter-flies, and divers other flying Insects, may have their shape and colours preserv'd, I know not how long, by running them through in some convenient part with Pins, and therewith striking them to the inside of large Boxes. And on this occasion, I remember, that having sometimes reflected upon the lasting of Spiders, Flyes, and other small living Creatures, that having been casually enclosed in Amber whil' it was soft, are ever preserv'd entire and uncorrupted, I thought it not amiss to try whether some substance, like Amber (at least as to the newly mention'd use of it) might not easily be prepar'd by Art: And hereupon I quickly found, that by taking good clear *Venice* Turpentine, and gently evaporating away about a third part of it (sometimes more, sometimes less, according to the exigency of my particular purpose) I could make a reddish Gum, diaphanous and without Bubbles, which would melt with a very gentle heat, and easily (being suffered to cool) become again so hard as to be brittle. This resinous Substance should be melted with as little heat as is possible (and therefore should be first powder'd) that the texture of the Vegetable or Animal Bodies to be cas'd over with it, might receive the less alteration: And when it is brought to the requisite degree of fluidity, then the Body to be preserv'd (being, if that be needful, stuck through with a Pin) must be gently plung'd into it, and presently taken out and suffer'd leisurely to cool, being turn'd, from time to time, this way or that way, if there be occasion, that the investing Mat-

And Insects.

ter

ter may be every where of an equal thickness upon it. And if at the first time the Case be not thick enough, it may again, when it is cold, be immersed into the liquid Matter (as Chandlers are wont to thicken their Candles, by dipping them frequently into melted Tallow) of which some will every way adhere to it. And though these cases be inferior to Amber, in regard of their being more apt to be sull'd by dust, or otherwise; yet that inconvenience may be easily remedied, by keeping them shut up in Glasses or Boxes, at those times when one hath not occasion to consider them: And their clearness (especially if they be thin) and their smooth surfaces, together with their exactly keeping out the Air from the Body they enclose, may, perhaps, make so cheap and easy an Experiment, a not unwelcome trifle, especially considering how easily 'tis capable of Improvement.

But to return to the Preservation of more bulky Bodies, 'tis a known thing, to the Collectors of Rarities, that the external *Idea* of Fishes, Crocodiles, Birds, and even Horses, may be preserv'd for many years, by taking out the more corruptible parts; and stuffing their prepared Skins with any convenient Matter. And that the internal membranous parts of Bodies may be long and easily kept from putrefaction, is not unknown to many Anatomists. And not to mention what we have try'd of this sort, we have seen the Veins, Arteries, and Nerves of a humane Body, laid out in their natural situation upon three Boards, by the pains and skill of an accurate Anatomist of Padua. And elsewhere, *Uterum vidimus atque omnia mulieris genitalia*, together with the Bladder, all displaid upon a Board, preserved for many Years so entire, and in a situation so near the Natural, that this Scheme was far more instructive, than the most accurate Printed one could possibly be. We have likewise known the flesh of Vipers, kept not only sweet, but efficacious, for divers Years, by the smoak of a peculiar

And more bulky bodies.

Particularly the Schemes of divers parts of humane body.

liar Powder, chiefly consisting of Aromatick Ingredients, and of which, you, *Pyrophilus*, may command the Composition.

We have also seen the Skeleton of a Monky, made, by an excellent French Chyrurgion of our acquaintance, whereon the Tendons and Fibres of the Muscles were so preserved, that it was looked upon as rarity, very usefull to shew their Originations and Insertions, and to explaine the motions of the Limbs: And perhaps there may be some way to keep the Arteries & the veins too, when they are empty'd of Blood, plump, and unapt to shrinke over-much, by filling them betimes with some such substance, as, though fluid enough when it is injected to run into the Branches of the Vessels, will afterwards quickly grow hard. Such may be the liquid Plaister of burnt Alabaster, formerly mentioned, or Ising-glasse steeped two dayes in Water, and then boyl'd up, till a drop of it in the cold will readily turn into a still Gelly. Or else *Saccarum Saturni*, which if it be dissolved often enough in Spirit of Vinegar, and the Liquor be each time drawne off againe, we have observed to be apt to melt with the least heat, and afterwards to grow quickly into a somewhat brittle consistence againe. But I must not insist on these Fancies, but rather adde, That I have knowne an *Embrio*, wherein the parts have been very perfectly delineated and distinguishable, preserved unputrified for severall Yeares, and I thinke it still continues so, by being seasonably and artificially embalmed with Oyle (if I much mis-remember not) of Spikes. And I have elsewhere seen a large *Embrio*, which after having beene preserved many Years, by means of another Liquor (whose composition I do as yet but guesse at) did, when I saw it, appeare with such an admirable Entirenesse, Plumpnesse, and Freshnesse, as if it were but newly dead: And that which concurs to make me hope that some nobler way may be yet found out, for the preservation of dead Bodies, is, that I am not convinc'd that nothing can powerfully resist Putrefaction

Of the preservation of an *Embrio* divers yeares by embalming it with Oyle of Spikes.

refraction in such Bodies, but things that are either saline and corrosive, or else hot; Nor that the Embalming Substances cannot be effectually apply'd, without ripping open the Body to be preserv'd by them. For *Josephus Acosta*, a sober Writer, relates, That in certaine *American* Mountaines, Men, and the Beasts they ride on, sometimes are kill'd with the Winds, which yet preserve them from putrefaction, without any other help. So insensible a quantity of Matter, such as it may be, may, without Incision made into the Body, both pervade it, and as it were Emalme it. I know also a very experienc'd and sober Gentleman, who is much talk'd of for curing of Cancers in Womens Breasts, by the outward Application of an Indolent Powder; some which he also gave me, but I have not yet had the opportunity to make tryall of it: And I shall anon tell you, that I have seen a Liquor, which without being at all either acid or caustick, is in some Bodies farre more effectually against Putrefaction, than any of the corrosive Spirits of Nitre, Vitriol, Salt, &c. and than any of the other saline Liquors that are yet in use. We have also try'd a way of preserving Flesh with Musk, whose effects seem'd not despicable to us, but must not here be insisted on.

Instances of men in the *American* Mountains kill'd and afterwards preserv'd from putrefaction only by the Wind.

Nor were it amisse that diligent Tryal were made what use might be made of Spirit of Wine, for the preservation of a humane Body: For this Liquor being very limpid, and not greasie, leaves a cleare prospect of the Bodies immerst in it; and though it do not fret them, as Brine, and other sharp things commonly employ'd to preserve Flesh are wont to do, yet it hath a notable Balsamick Faculty, and powerfully resists Putrefaction, not onely in living Bodies (in which, though but outwardly apply'd, it hath been found of late one of the potentest Remedies against Gangrens) but also in dead ones. And I remember that I have sometimes preserv'd in it some very soft parts of a Body for many months) and per-

Of the Use of Spirit of Wine for the preservation of Bodies from putrefaction.

haps I might had done it for divers Years, had I had opportunity) without finding that the consistence or shape was lost, much less, that they were either putrifi'd or dry'd up: We have also, by mixing with it Spirit of Wine, very long preserv'd a good quantity of Blood, so sweet and fluid, that it was wondred at by those that saw the Experiment. Nay, we have for curiosity sake, with this Spirit, preserved from further stinking, a portion of Fish, so stale, that it shined very vividly in the dark; in which Experiment, we also aimed at discovering whether this resplendent quality of the decaying Fish would be either cherished or impaired by the Spirit of Wine (whose operations in this tryall we elsewhere informe you of) and it would be no very difficult matter for us to improve, by some easie way, this Balsamicall Virtue of Spirit of Wine, in case you shall think it worth while: But not to anticipate what I may more properly mention to you elsewhere, I shall at present say no more touching the Conservation of Bodies, since probably by all these, and some other particulars, we may be induced to hope so well of humane Industry, as not to despair, that in time some such way of preserving the Bodies of Men, and other Animals, will be found out, as may very much Facilitate and advance too, Anatomicall Knowledge. Neither is it onely by advancing This, that the Naturalist may promote the Physiologicall part or Physick: for since the Body consists not onely of firme and constant parts, as the Bones, Muscles, Heart, Liver, &c. but of fluid ones, as the Blood, Serum, Gall, and other Juices; And since consequently to the compleat Knowledge of the use of all the parts we should investigate not onely the Structure of the Solid ones, but the Nature of the fluid ones: The Naturalist may do much more than hath yet been done, towards the perfecting of this Knowledge, not only by better explicating what it is in generall makes Bodies either Consistent or Fluid, but by examining

That the Examination of the Juices of humane body by the Art of Chyrurgery may illustrate their Use & Nature.

examining particularly, and especially in a Pyrotechnical way, the Nature of the several Juices of the Body, and by illustrating the Alterations that those Juices, and the Aliments they are made of, receive in the Stomach, Heart, Liver, Kidneyes, and other *Viscera*. For although a humane Body being the most admirable Corporeal piece of Workmanship of the Omniscient Architect, it is scarce to be hoped, but that even among the things that happen ordinarily and regularly in it, there will be many which we shall scarce be able to reach with our Understanding, much less to imitate with our Hands: Yet peradventure, if Chymical Experiments, and Mechanical Contrivances, were industriously, and judiciously, associated by a Naturalist profoundly skill'd in both, and who would make it his Business to explain the *Phænomena* of a Humane Body, not only many more of them than at first one would think, might be made more intelligible than as yet they have been; but divers of them (especially those relating to the motions of the Limbs and Blood) might be by artificial Engines (consisting as the Pattern not only of Solid but Liquid and Spirituous parts) not ill represented to our very Senses: since a humane Body it self seems to be but an Engine, wherein almost, if not more then almost, all the Actions common to Men with other Animals, are performed Mechanically. But of the difference of these living Engines from others, I may elsewhere have a fitter opportunity to discourse to You. For at present, *Pyro*. I have employed so much of the little time my Occasions will allow me to spend upon the Treatise I am now writing, in making out to you the Usefulness of Natural Philosophy, to the Physiological Part of Physick, that I must not only not prosecute this subject, but must both hasten to mention, and to mention the more cursorily its serviceableness to the four remaining Parts of the Physicians Art,

That the Actions which are common to Men with other Animals being perform'd Mechanically, the Skill of Mechanicks must be of Use to Physiology,



ESSAY II.

*Offering some Particulars relating to the
Pathological Part of Physick.*

That the Naturalists Knowledge may assist the Physician to discover the Nature and Causes of diseases.

AND to say something in the next place of *Pathology*, that the Naturalists knowledge may assist the Physician to discover the nature and causes of several Diseases, may appear by the light of this Consideration, that, though divers *Paracelsians* (taught, as they tell us, by their Master) do but erroneously suppose that Man is so properly a Microcosm that of all the sorts of Creatures whereof the Microcosm or Universe is made up, he really consists; yet certain is it that there are many Productions, Operations, and Changes of things, which being as well to be met within the great, as in the little world, and divers of them disclosing their natures more discernably in the former, than in the latter, the knowledge of the nature of those things as they are discoverable *out* of mans body, may well be supposed capable of illustrating many things *in* man's body, which receiving some Modifications there from the nature of the Subject they belong to, pass under the notion of the Causes or the Symptoms of Diseases. If I were now, *Pyrophilus*, to discourse to you at large of this Subject, I think I could convince you of the truth of what I have proposed. And certainly, unless a Physician be (which yet I fear every one is not) so much a Naturalist, as to know how Heat and Cold, and Fluidity, and Compactness, and

and Fermentation, and Putrefaction, and Viscosity, and Coagulation, and Dissolution, and such like Qualities, are generated and destroyed in the generality of Bodies, he will be often very much to seek, when he is to investigate the causes of preternatural Accidents in men's bodies, whereof a great many depend upon the Presence, or Change or Vanishing of some or other of the enumerated Qualities, in some of the Fluid or Solid Substances that constitute the body. And that the Explications of a skilful Naturalist may adde much to what has hitherto commonly been taught concerning the Nature and Origine of those Qualities in Physicians Schools, a little comparing of the vulgar Doctrine, with those various Phænomena, to be met with among Natural things, that ought to be, and yet seem not to be, explicable by it, will easily manifest to you. And questionless 'tis a great advantage to have been taught by variety of Experiments in other bodies, the differing wayes whereby Nature sometimes produces the same effects. For since we know very little *a priori* the observation of many such effects, manifesting, that nature doth actually produce them so and so, suggests to us several wayes of explicating the same Phænomenon, some of which we should perhaps never else have dream'd of. Which ought to be esteem'd no small Advantage to the Physician; since he that knows but one or few of Natures wayes of working, and consequently, is likely to ignore divers of those whereby the propos'd Disease (or Symptome of it) may be produc'd, must sometimes conclude, that precisely *such* or *such* a thing is the determinate Cause of it, and apply his Method of relieving his Patient accordingly; which often proves very prejudicial to the poor Patient, who dearly payes for his Physicians not knowing, That the Quality that occasions the Distemper, may be as probably, if not more rationally, deduc'd from an other Origine, then from that which is presum'd. This will

Prov'd by general Reason.

scarce be doubted by him that knows how much more likely Explications than those applauded some Ages since, of divers things that happen as well within as without the body, have been given by later Naturalists, both Philosophers and Physicians: and how much the Theory of the Stone, and many other diseases, that has been given us by those many Physicians, that would needs deduce all the Phænomena of diseases from Heat, Cold, and other Elementary Qualities, is Inferiour to the Account given us of them by those ingenious Moderns, that have apply'd to the Advancement of Pathology, that Circulation of the Blood, the Motion of the Chyle by the Milky vessels to the Heart, the consideration of the effects deducible from the Pores of greater bodies, and the motion and figuration of their minute parts, together with some of the more known Chymical Experiments: though both of those, and of the other helps mention'd just before them, I fear men have hitherto been far enough from making the best use, which I hope it will dayly more and more appear they are capable of being put to. He that has not had the curiosities to enquire out, and consider the several waies, where by Stones may be generated out of the body, not only must be unable satisfactorily to explicate how they come to be produc'd in the Kidnies and in the Bladder, but will, perhaps, scarce keep himself from embracing such errors, because authoriz'd by the suffrage of eminent Physicians, as the knowledge I am recommending would easily protect them from. For we find divers famous, and, otherwise, learned Doctors, who (probably because they had not taken notice of any other way of hardening a matter once soft into a stonelike consistence) have believ'd and taught that the Stone of the Kidneyes is produc'd there by slime baked by the heat and dryness of the Part; as a Portion of soft Clay may, by external heat, be turn'd into a Brick or Tile. And accordingly they have

By particular
Instances of
the cause of
the Stone in
the Kidneyes.

for

for cure, thought it sufficient to make use of store of Remedies to moisten and coole the Kidneys; which, though in some bodies this be very convenient, are yet far inferiour in efficacy to those Nobler medicines, that by specifick qualities and properties are averse to such coagulations as produce the Stone. But (not to mention what a Physician skill'd in Anatomy would object against this Theory from the nature of the part affected) 'tis not unlike, the embracers of this Hypothesis would not have acquiesc'd in it, if they had seen those putrefactions out of the Bodies of Men, which we elsewhere mention'd. For these would have inform'd them, that a Liquor abounding with petrescent parts, may not onely turne Wood (as I have observed in a petrefying Spring) into a kind of Stone, and may give to Cheese and Mosse without spoiling their pristine appearance a strong hardnesse and weight; but may also produce large and finely shap'd Chrystalline bodies (though those I try'd were much lesse hard than Chrystall) in the bosome of the cold water. Which brings into my mind, that I have divers times produc'd a body of an almost stony hardnesse in lesse than halfe an houre, even in the midst of the water, by tying up in a rag, about the quantity of a Nutmeg, of well and recently calcined Alabastrre, which being thus ty'd up and throwne into the botome of a bason full of water, did there speedily harden into a Lapideous Concretion. And that even in the bodies of Animals themselves such concretions may be generated much otherwise than the Hypothesis we have been speaking of supposes, may appear by what happens to Craw. fishes, which though cold Animals, and living in the waters, have generated at certaine seasons in their heads Concretions, which for their hard and pulverizable consistence, divers Authors called *lapides Cancrorum*, though in the Shops they are often but abusively styled *Oculi Cancrorum*. And such strong concretions are affirm'd

The cause of that disease illustrated by the putrefaction of Wood, Cheese, Mosse, Water, &c.

to

to be generated in these Fishes every yeare, which I the lesse scrupled at, because I have not found them at all times in the Head of the Fish. And besides, these and many more Concretions, that had they been observ'd by the Physicians we have been speaking of, might easily have kept them from acquiescing in, and maintaining their improbable explication of the manner of the Stones nativity: There is yet another kind of Coagulation, which may both be added to the former, and perhaps also serve to recommend the use of Chymicall Experiments, investigating the Causes of Diseases: This is made by the mixture of exquisitely dephlegm'd Spirit of fermented humane Urine, with as exactly rectified Spirit of Wine; for upon the confusion of those two volatile Liquors in a just proportion, they will both of them, as after *Lullius* Experience hath inform'd us, suddenly coagulate into a white Masse, which *Helmont* calls *Offa alba*, and by which, he endeavours to declare the procreation of the *Duelech*: for supposing himsele to have found in humane Urine a potentiall *Aqua vita*, or Vinous Spirit, capable of being excited by a putrid ferment, and coagulable by the volatile Salt of the same Urine, if there were any volatile Earth lurking in the Liquors, That being apprehended by the uniting Spirits, and coagulated with them both, he supposeth there may emerge from the union of those three Bodies such an anomalous Concretion, as he, after *Paracelsus*, calls *Duelech*.

And that a subtile Terrestrial Substance may lurke undiscerned, even in limpid Liquors, may appear, not only in Wine, which rejects and sustens to the sides of the containing Vessel, a Tartar, abounding in Terrestrial Feculency; and in common Urine of healthy men, which, though cleare at its first emission into the Urinall, does, after a little rest there, let fall an *Hypostasis*, or Sediment, which, if distill'd before fermentation, leaves in the bottom of the Cucurbite an Earthy Sub-

The Origine
of *Helmonts* al-
ba *Offa*, and
Paracelsus his
Duelech by the
mixture of Spi-
rit of Wine and
Spirit of Urine,
an example of
the Generation
of the Stone.
Helmont. de
Lith. cap. 3.
C. 4.

Substance, and commonly some Gravel: but even in rectified Spirit of Urine it self I have had opportunity to observe, That after very long keeping, there hath spontaneously precipitated a Feculency, copious enough in proportion to the Liquor that afforded it. Nay, in another parcel of Spirit of Urine, that hath been kept much longer then that already mentioned, we observed the other-day, that not only there was a Terrestrial residue fallen to the bottom of the Glass, but to the sides of it as far as the Liquor reached, there adhered a great multitude of small Concretions; which, as far as appeared by looking on them through the Chrystal Viol, to whose insides they are fastened, were no other then little grains of Gravel, such as are often found sticking to the sides of Urinals, employed by calulous persons.

That a terrestrial substance may lurk undiscerned in limpid Liquors,

To which we might adde an Experiment of ours, whereby we are wont almost in a moment, by barely mixing together a couple of Liquors, both of them distilled and transparent, and yet not both of them saline to thicken them very notably and permanently, insomuch that they seem not to precipitate each other; yet having once, for curiosity sake, distilled them with a pretty strong Fire, I obtained a great quantity (as I remember, a fourth of the whole mixture) of a blackish Mass, that was not only coagulated and dry, but even brittle: But of the coagulation of distilled Liquors, such as even Chymists themselves are not wont to look upon as at all disposed to coagulation, I may elsewhere have a better opportunity to entertain you, and therefore I shall forbear to do it now.

And by this way, *Pyrophilus*, doth *Helmont*, if I understand him aright, attempt to make out the generation of the Stone in humane Bodies: In which Theory, though some difficulties do yet keep me from acquiescing, yet, besides that perhaps what you will meet with by and by (about the distillation of the *Ductech*) may make you the lesse wonder at this

c

ex.

explication. Besides this, I say, granting that none of the enumerated ways of Petrescency (if I may so speak) deserve to be look'd upon as satisfactory; yet to give so much as an account, *not very absurd*, of a Disease so anomalous and abstruse, and hitherto so unluckily explicated by Physicians, is perhaps more difficult, than it were to give (at least) a *plausible* account of divers other Distempers.

And possibly it may be safely enough affirmed, That not only Physiology, in its full extent, but that Hand-maid to it, which is call'd Chymistry, may not a little contribute to clear up the nature of both of the digestions, and of those deficiencies or aberrations in them, which produce a great part of Diseases; especially if we allow what, as well Physicians, as Spagyrist agree in (whether warily enough or not, I shall not now dispute) *viz.* That whatever is separable from Bodies by the Fire, was, as a Constituent Element (or Principle) pre-existent in them.

Perhaps I need not mind you, *Pyrophilus*, that 'tis usual with the merely *Galenical* Doctors themselves, to explicate the nature of Catarrhes, by comparing the Stomach to a seething Pot, and the Head to an Alembick, where the ascending Vapors, being, by the coldness of the Brain, condensed into a Liquor, sometimes distil upon the Lungs, and sometimes fall upon other weakned parts; in which explication, though for divers reasons I cannot acquiesce, yet it may suffice to shew you how little scruple many Learned men, not like to be partial in the Case, would make of employing Chymical Operations to illustrate the Doctrine of Diseases. And indeed, since the Liquors contained in the Body abound, divers of them, with saline or sulphureous parts, he that hath been by Chymistry taught the nature of the several sorts of Salts and Sulphurs, and both beheld and considered their various actions one upon another, and upon other Bodies, seems to have

The use of
Chymistry in
explaining the
Nature of, and
aberrations in
your Digestions,

have a considerable help to discourse groundedly of the Changes and Operations of the humors, and other Juices contain'd in the Body, which he hath not that hath never had *Vulcan* for his Instructor. He that finds that there may be acid Juices in the Stomach, and elsewhere (as is frequently evident in the sharp Liquors which many Stomachs cast up) and that there are also Sulphureous Salts in the Body (as is apparent in Blood and Urine, which abound with such.) He that knows that the *Serum* that swims upon the Blood out of the Body, is by a gentle heat immediately coagulable into a thick whitish Substance, not unlike a Custard; and that Chymically analyz'd Blood yields store of volatile and sulphureous, but (as far as our tryals have hitherto inform'd us) no acid saltnefs:

Proved by a
Catalogue of
considerable
Observations.

He that knows that these Animal Salts and Spirits may be so powerful, that we have been able with Spirit of Urine, or of Harts' horn, to make a red Solution of Flowers of Sulphur, and that with Spirit of Urine (though drawn without violence of Fire) we have (as we elsewhere more particularly declare) dissolved both in a very gentle heat, and in a very short time, the un-open'd Body of crude Copper, so as to make thereof a Solutions of a rich, deep, and even opacous Blew: And that we have done almost the like with unrectified Spirit of Mans Blood:

He that hath, as we have done, examined by Fire (especially produced by the help of a Burning-glasse) that limpid Liquor that is to be found in the Limphatick Vessels, and hath taken notice of that odde consistence, smell, crackling, and other qualities discernable in it by heat.

He that observes how acid Liquors lose their acidity, by working upon some Bodies; as when Spirit of Vineger grows almost insipid upon the coral it hath corroded, *and* how those saline Liquors, by working upon certain Bodies, degenerate into Salts of another nature, as we have sometimes observed

in Oyl of Vitriol, working upon the fourth part of its weight of Quick-silver, and how the contrariety of acid and sulphureous Salts makes them sometimes disarm, sometimes, after some ebullition, precipitate each other, and sometimes unite into a third substance, of a differing nature from either of those from whose coalition it results, as we see in *Tartarum Vitriolatum*; and, as I have observed, in a Salt, I sometimes make to emerge from a due proportion of Oyl of Vitriol and Spirit of Urine, freed, after conjunction, from their aqueous moisture: And He, in a word, that hath carefully analyzed and made trials on many parts, both of the Macrocosm and Microcosm, and heedfully applyed his Experiments made on the former, to the illustration of the changes observable in the latter, shall be likely to explicate divers particulars in Pathology, more intelligibly then he that is a stranger to Chymistry.

And though I am very unwilling to meddle with Medical Controversies, and am apt to think, that Chymists are wont to speak somewhat too slightly of the humours of the humane Body, and allow them too little a share in the production of Diseases; yet (to skip other reasons) the strange stories related by *Skenkius*, and other eminent Physicians, of the corrosivenesse of some Juices, which, rejected by Urine or Vomits, have been able to boyl on Brass, fret Linnen, and stain Silver; together with some odde Observations of this nature our selves have had opportunity to make, do very much incline us to believe, That the generality of former Physicians have ascrib'd too much to the Humours, under the notion of their being hot and dry, cold and moist, or endowed with such other Elementary Qualities, and have taken a great deal too little notice of the saline (if I may so speak) and Sulphureous Properties of things. And in this Opinion I am not a little confirmed by the authority of *Hippocrates* himself, both in other passages, and especially where he says.

Non

That salt and sulphur have more influence in the causation of diseases then the first qualities are, heat, cold, &c.

Non calidum, frigidum, humidum, aut siccum esse quod magnam agendi vim habet, verum amarum & salsum, & dulce & acidum, & insipidum & acerbum, &c. are the things which, though inoffensive to the Body, whilst they duly allay each other, prove hurtful to it, and distemper it, when any of them comes to sever it self from the rest, and grow predominant. And indeed, if the Juices of the Body were more Chymically examin'd, especially by a Naturalist that knows the ways of making fix'd Bodies volatile, and volatile fix'd, and knows the power of the open Air in promoting the former of those Operations; it is not improbable, that both many things relating to the nature of the Humors, and to the wayes of sweetning, acuating, and otherwise altering them may be detected, and the importance of such Discoveries may be discern'd.

And perhaps it would adde to the usefulness of such an examination, if it were extended to the noxious Juices in distemper'd bodies: such as the rotten Phlegme spit up by those whose Lungs are disaffected; the slimy excretions voided in the Lientery, and the liquor that distends the *abdomen* in the Dropsie and *Ascites*: concerning which (to tell you that upon the by) I found that it was of a differing nature from either Water or Urine. For a *paracentesis* being made in the *abdomen* of one dangerously sick of this sort of Dropsie, I found that the Liquor would keep a pretty while without putrefaction, (nor did the Patients body, when I afterwards saw it opened, smell almost at all, though the inside of the *abdomen* lookt well near as black as if it had been sphacelated;) and having steamed away some of it, whilst it was pretty fresh, over a somewhat slow fire, it first coagulated into a substance like Whites of Eggs, and, by a little farther evaporation, turned to such a glutinous substance as tradesmen are wont to call *Size*; and being kept longer on the fire grew to be hard like

Observations made upon the liquor that distends the abdomen in the Dropsie.

Paracentesis.

like fish glew, but more brittle, and transparent enough, but with a little tincture of a greenish yellow; and some of the forementioned liquor being distilled in a Retort, did towards the end of the operation so darken the vessel with a thick blackish oyl, as hindred me from discerning what else perhaps I might have seen. And I suppose it may prove a useful instance to the former purpose, if I somewhat circumstantially annex here what occurred to me, when I was accidentally considering of the *Calculus humanus*.

Observations
on the *calculus*
humanus.

Having therefore obtained of a skilfull Lithotomist of my acquaintance divers Stones, which he had cut out of mens bladders, I chose a couple of them (which were whitish almost, of equal bigness, and figure, which was near oval, and which together weighed about two ounces and an half) these with the help of a strong knife I carefully opened, to find whether or no either of them consisted of an entire and uniforme matter, (at most other stones, and even some *calculus humani* do) and I found that each of them was made up of several shells, as it were, successively involving one another, like the rinds of an Onion. And such shells, but more soft, and more of a colour we likewise observed in a great stone taken a while since out of an Oxe's Gall, and sent us for a present; and though all of these were of an almost stony hardness, yet that hardness was not equal in them all, and in one of the stones we observed one of the rinds (to make use of that expression) to be of a differing colour both from that which immediately embraced it, and from that which it immediately embraced: some of these rinds equalled in thickness the length of a barley corne, and others were somewhat thinner. Though they did closely embrace one another, yet they were actually separable, as well as visibly distinguishable. And proceeding very warily in the breaking one of these stones, we found that in the center of it, there lay a small and soft oval stone

stone, as it were the kernel of those conglomerated shells; and this kernel lay so loose, that with a little industry and patience we picked it out of the shell, and kept it by us as a rarity. This done, being desirous to know whither Chymical Tortures would force these Concrets to a further confession of their nature, we caused them to be finely powdred, and put into a small but strongly coated glass Retort, whereunto luting a much larger Retort for a Receiver, we found that these two ounces and half of Powder, being distilled for some hours in a naked fire, afforded us great store of volatile Salt (partly grey and partly white) which almost covered the inside of the Receiver, and a pretty quantity of reddish spirit, which in the Receiver it self soon coagulated into Salt, and having severed our vessels, we found in the neck of the Receiver a very little darkish Oyl, but in the neck of the Retort a greater quantity of the same adust Oyl, incorporated with a pretty quantity of volatile Salt, whose smell did readily recal to my mind that peculiar kind of stink which I had sometimes taken notice of in the volatile Salt of unfermented Urine; nor were the tastes of these two Salts unlike. The *caput mortuum* consisted of a fine, light, coal-black Powder, not unlike the finest sort of Soot, and by weighing but of six Drachmes, it informed us, that above two thirds of the distilled *calculi humani* had been, as being volatile, forced from the Terrestrial Parts, even in a close Vessel, wherein the *caput mortuum*, though it were left insipid enough, yet retained stink enough to make us think, it still contained pretty store of heavy Oyl: as indeed, having put it into a Crucible, and kept it a competent while in a stronger fire, we found it reduced to about two Drachmes of a brittle Mass of insipid white Calx, which did not slack, or fall asunder like Lime when it is cast into Water.

To

Of the changes
that may rea-
sonably be
thought to
happen to our
aliments with-
in the body.

To this Example of the usefulness of Chymistry, to discover the unobserved, and otherwise scarce discoverable difference of the *calculus humanus* from other stones, we may venture to adde, That though some *Paracelsians* do take too much liberty, when they crudely tell us, that there are arsenical, vitriolate, aluminous, and other mineral substances, generated in humane bodies, yet if they had more warily propos'd their Doctrine, it would not perhaps appear so absurd, as they are wont to think it, who considering only the nature of the Aliments men usually feed upon, cannot conceive that such being but either Animals or Vegetables, can by so gentle a heat as that of man's body, (by which they suppose all the changes of the Aliments must be effected,) be Exalted to an energie like that of such bodies as are compos'd of active Mineral substances, and have some of them perchance acquir'd a violence of operation from the fire. But we see that Concretions, so like Stones, (which belong to the Mineral Kingdom,) as to passe generally for such, may be produc'd in the bodies not only of men but of sucking children, whose Aliment is fluid Milk: and it seems a mistake to imagine (how many soever do so) that Heat must needs be Efficient of all the changes the matter of our Aliments may happen to undergo in a humane body: where there are Streiners, and Solvents, and new Mixtions, and perhaps Ferments, and diverse other powerful Agents, which by successively working upon the assumed matter, may so fashion and qualifie it, as, in some cases, to bring the more dispos'd part of it to be not unlike even fossile Salts, or other mineral substances. A very eminent person was lately complaining to me, that in the fits of a distemper, which almost as much puzzles her Physicians as her self, she sometimes vomits up something so sharp and fretting, that, after it hath burnt her throat in its passage, almost like scalding water, it doth not only Stain the Silver vessels that received it,

it, but also worke upon them as if it were a Corrosive Menstruum. And there dyed a while since a very intelligent person, much employed in publick affaires, who complained to me, that in the fits of the strange distemper he laboured under, he divers times observed, that, that part of his pillow which his breath passed along, would by the strange fuliginous Steams, which that carried off with it, be blackt over, as if it had been held in some sooty smoak or other.

We may also consider, that the Rain-water, which in its passage through a Vine, or an Apricock-tree, or the like plants, is turned into a sweet fruit in its passage through those plants that bear Lemmons and Barberries, is transmuted into a liquor sharpe enough to corrode, not only Pearles but Coral, *lapides cancrorum*, and other hard Concretes, as Spirit of Vitriol would do. And writers of unsuspected credit, affirme, that an *Indian* fruit, (whose name I cannot readily call to mind) will speedily corrode and waste the very Steele knives 'tis cut with, if its Juice be left long upon them: and we see that some sorts even of our Apples and Peares, will quickly blacke the blades of Knives on which the Juice is suffered to continue. And lest what I freshly mention'd about Lemmon-trees, should be question'd, I will here adde, that I remember also that I have made not only some other hot and strongly tasted Herbs, but even a *Ranunculus* it selfe, to grow and increase notably in weight as well as bulke, though I fed it but with faire water: and allowed it nothing else to shoot its root into. Wherefore since this Plant is reckon'd amongst those that either are poysonous, or want but little of being so, and since its operation is so violent, that this sort of Vegetables, is taken notice of from the experience of Country people, to be able by outward application to draw blisters, and since nevertheless that which this Plant, without any heat discernable by the touch, transmutes into so virulent a substance, is but so una-

Illustrated by
the example of
Juices out of
the body.

Give a body as water, why may not such aliments, as may have in them divers parts of a far more operative nature, be in a humane body, by an unusual concurrence of Causes and Circumstances, so altered and exalted, as to approach in operations (especially upon the more tender parts) to those of fossile Salts or other Minerals? So that a Chymist might upon such an account, without any great absurdity, teach some parcels of Morbifick matter to be of an Arsenical, or Vitriolate, or an Antimonial nature, especially since we see that sometimes Cancers, Ulcers, and sharp Juices generated in the body, do by their vitiating and wasting the invaded parts, but too much emulate the pernicious operations of Arsenick, and of fretting Salts: and the infusion of Antimony doth scarce more stimulate nature to disburthen her self both upwards and downwards, than doth sometimes an humour; such as that which causes the *Cholera morbus*, and perhaps more violent diseases.

And that such degenerations of Innocent aliments should sometimes happen in discomposed bodies, you will perhaps think the less strange, if you duly perpend what I lately mention'd of the transmutation of Water into hot and vesicatory substances; and if thereto I annex, that from a single pound of so common and temperate an Aliment as Bread, I can by an easie way, (and that without addition) obtain many ounces of a *menstruum*, which (as tryal has inform'd) will work more powerfully upon bodies more compact than some hard minerals, or perhaps Glass it self, than a wary Chymist would expect to see *Aqua fortis* do. These things I have mention'd, *Pyrophilus*, to intimate some of the Reasons, why I think Chymical Experiments may be usefully apply'd, to illustrate some things in Pathologie, either by imitating out of the body, the productions of some sorts of morbidick matter, or by such resolutions as that which is generated in the body, as may conduce to the discovery of its nature. And not that

I think, as Spagyrist's do, the experiments or notions of vulgar Chymists sufficient to explicate the whole doctrine either of Digestion or of Diseases: for it would be very difficult for them to make out the manner of Nutrition, or so much as how they that feed only on Vegetables, should (to propose the difficulty in their own Terms) have their Blood and Urine copiously enrich'd with a Volatile sulphureous Salt, of which sort, plants are not wont to yield any in distillation. And much more difficult would it be for them by principles peculiar to Chymists to make out the propagation of Hereditary diseases: or how madness, & some other distempers, that do not visibly vitiate the organs of those functions that they pervert, should not only prove hereditary, but lurk very many years in the inheriting persons body, before they begin to disclose themselves: and sometimes too, be transmitted from the Grandfather to the Grand-child, and skip immediately the intervening Son. And therefore I say again, that I pretend not that Vulgar Chymistry will enable a Physician to explicate all or most of the Pathological *Phænomena*; but that True Chymistry may assist him to explicate divers of them, which can scarce be solidly explicated without it. And let me adde, that he that thoroughly understands the nature of Ferments, and Fermentations, shall probably be much better able then he that ignores them, to give a fair account of divers *Phænomena* of several diseases (as well Feavers as others) which will perhaps be never thoroughly understood, without an insight into the doctrine of Fermentation; in order to which, for that and other reasons, I design'd my Historical notes touching that subject.

Yet I am not sure, but there may be effervescences, (and perhaps periodical ones) in the Blood and other Juices of the body without Fermentation properly so call'd. For there may be divers other ways of begetting a præternatural heat

Difference between Vulgar and true Chymistry.

The Use of the Knowledge of Fermentation.

Of Periodical effervescences in the blood without Fermentation.

in the Blood. We often see that in Coughs, when the flegme is rotten (as they speak) that is, when its former viscus texture is altered, it does no longer stick fast to the vessels of the Lungs, to which it obstinately adher'd before. And so at certain times other humours in the body, either by growing more fluid themselves, or by some change in the Blood, whereby it becomes fitter to dissolve such humours, may swimme in, and be circulated with the mass of blood, and thereby occasion præternatural heats: *either* by their indisposition to be well incorporated therewith: *or* by altering its texture: *or* disturbing the wonted motion of its minute parts. *or* by opposing its due Rarefaction as it passeth through the Heart: *or* by obstructing the more slender Vessels, and so hindering the free Circulation of the Blood through them; perhaps also causing some Extravasation, as we see that wounds &c. ulcers are attended with some inflammation, more or less, of the part affected; or by some other of the wayes not now to be declared. And tryal hath taught me, that there are Liquors in which the bare admixture of Milk, Oyl, or other Liquors, nay or of cold water, will presently occasion a notable heat: and I sometimes employ a *menstruum*, in which nothing but a little flesh being put, though no visible Ebullition ensue, there will in a few minutes, be excited a Heat intense enough to be troublesome to him that holds the Glâss. And yet it seems not necessary that this should be ascrib'd to a true fermentation, which may rather proceed from the perturb'd motion of the Corpuscles of the menstruum, which being by the adventitious liquor or other body put out of their wonted motion, and into an inordinate one, there is produc'd in the menstruum a brisk confus'd Agitation of the small parts that compose it; and in such an agitation (from what cause soever it proceeds) the nature of Heat seems mainly to consist. But to dispatch, I scarce doubt, but that if in the history of diseases, there were better notice

notice taken of those *Phænomena*, that agree not with the opinions already in request, as well as of those that are thought consonant to them; and if also Chymical tryals were skilfully varied and judiciously applyed to this illustrating of Pathological *Phænomena*, the former might be made conducing to the better explication of the latter: especially if the business were manag'd by a Naturalist well versed both in Chymical Experiments, and in Anatomy, and the history of Diseases, without being too much addicted either to the Chymist's notions, or the receiv'd opinions of Physicians.

And as the Naturalist may thus illustrate Pathology as a Chymist, so may he do the like as a Zoologer; for either the true knowledge of Anatomy must be much less useful to Physicians that they have hitherto believed, or else the discoveries made by recent Anatomists of the *Afelian*, *Pecquetian*, and *Bartholinian* vessels, by either overthrowing the receiv'd doctrine of Digestions, (from whose aberrations many diseases spring) or at least by making divers discoveries in relation to the Oeconomy of Digestions unknown to the Ancients, must probably contribute much to the clearing up of divers Pathological difficulties in the explication of some diseases; besides, that the very liberty of making those Experiments in live Beasts, which are not to be made but in living creatures, nor are allowable to be made in living men, may enable a Zoologist, by giving us a clearer account of divers parts of the body, to determine divers Pathological difficulties springing from either our ignorance or mistakes of the use of those parts, as by the formerly mention'd Experiment of the excision of a live dog's Spleen, and a watchful observation of all the diseases upon that Account, befalling him and other dogs so serv'd; much light perhaps may be given to the doctrine of the use of the Spleen, together with the diseases supposed to depend on that part, which I fear is hitherto (to the no

Of the Use of
Zoo'ogy to
the knowledge
of Diseases.

small prejudice of the Sick) by few Physicians thoroughly understood, and by many unhappily enough mistaken.

And here we may represent unto you, *Pyr.* that not only the dissections of sound Beasts may assist the Physician to discover the like parts of a humane body, but the dissections of morbid beasts may sometimes illustrate the doctrine of the causes and seats of diseases. For that this part of Pathology has been very much improved by the diligence of modern Physicians, by dissecting the bodies of men kill'd by Diseases, we might be justly accused of want of curiosity, or gratitude, if we did not thankfully acknowledge; For indeed much of that improvement of Physick, (for which the Antients, they were not alive, might envy our new Physicians) may, in my poor opinion, be ascribed to their industrious scrutiny of the Seat and Effects of the peccant matter of Diseases in the bodies of those that have been destroyed by them.

And that the instructions deducible from such observations may be either increased or illustrated by the like observations made in the bodies of Beasts, we have been inclin'd to think, partly by the having Chymically analyz'd (as they phrase it) the Blood of divers Brutes, as Sheep, Deer, &c. and found its Phlegme, Spirit, Salt, and Oyl, very like that of humane blood; and partly by our having observ'd in the bodies of several Brutes, (not excepting Filhes) Worms, Imposthumes, and the like, some of which seem'd manifestly to spring from such causes as are wont to produce resembling distempers in men: And if the acute *Helmont* had been a more diligent dissector of Beasts, he would perchance have escaped the Error he after others run into (and into which his Authority hath tempted others to run) when he affirm'd, that the Stone was a disease peculiar to men, for that in the bodies of Beasts, especially very Old ones, Stones are sometimes to be found, not only several Butchers have assured me, but you may gather partly

Helmonts error refuted, that the Stone is a disease peculiar to Man.

partly from that taken out of an Oxes Gall, which I have formerly mention'd, which was about the bigness of a Wall-nut) but principally from what I elsewhere deliver'd on purpose to disprove that fond assertion: and greater leisure may, upon another occasion, invite us to mention some Pathological Observations made in diseased Beasts, by which (were we not willing to hasten) we might now perhaps much confirm what we have propos'd touching the possibility of illustrating, by such Observations, the nature of some of the Diseases incident to humane bodies,

And here we may also consider that there are divers Explications of particular Diseases, or troublesome Accidents propos'd by Physicians, especially since the Discovery of the Bloods Circulation, wherein the Compression, Obstruction, or Irritation of some Nerve, or the Distension of some Veine by too much Blood, or some Hinderance of the free Passage of the Blood through this or that particular Vessel, is assign'd for the cause of this or that Disease or Symptome. Now in diverse of these cases the Liberty lately mention'd, that a skilful Dissector may take in Beasts, to open the Body or Limbs, to make Ligatures strong or weak on the vessels, or other inward parts, as occasion shall require, to leave them there as long as he pleaseth, to prick, or apply sharp liquors to any nervous or membranous part, and whenever he thinks convenient, to dissect the Animal again, to observe what change his Experiment hath produc'd there: such a Liberty I say, which is not to be taken in humane bodies, may in some case either confirm or confute the Theories propos'd, and so put an end to divers Pathological Controversies, and perhaps too occasion the Discovery of the true and genuine causes of the *Phænomena* disputed of, or of others really as abstruse.

To this let me adde, that there is a whole *classis* of diseases
to

to be met with in Physicians Bookes, which proceed not originally from any internall distemper of the Patient, but are produced by some exterior Poyson, and are therefore wont to be call'd by Doctors, *Morbi à veneno orti*, to the more accurate knowledge of divers of which Diseases, Experiments made on Brutes may not a little conduce: For though I deny not that some things may be Poysons to Man, that are not so to some Beasts; and on the contrary (as we have more than once given to a Dog, without much harming him, such a quantity of *Opium*, as would probably have suffic'd to have kill'd severall Men) yet the greater number of Poysons being such both to Man and brutes, the liberty of exhibiting them, when, and in what manner we please, to these (which we dare not do to him) allowes us great opportunities of observing their manner of operation and investigating their Nature as our selves have tryed, and that sometimes with unexpected events (as when lately a Cat ran mad, so that her Keeper was fain to kill her) upon a large dose of *Opium* which we caused to be given her.

And on this occasion I shall not scruple to transcribe an Observation out of a Discourse, I some yeares since writ to a Friend, about the turning Poysons into Medicines, because that Treatise I am like, for certain reasons, to suppress: The words, as I there find them, are these,

That the Venom of Vipers or Adders consists chiefly in the rage and fury wherewith they bite, and not in any part of the body that hath at all times a mortall property.

Before I take leave of *Vipers* (or *Adders*, as some will have those that here in England commonly passe for *Vipers*) it will not be impertinent to tell you, That it may be justly doubted, whether they be to be reckon'd amongst poysonous Creatures, in such a sense as those other venomous Creatures, who have in them a constant, and if I may so speake, grosse and tangible Poyson; for it may be supposed, that the venom of *Vipers* consists chiefly in the rage and fury wherewith they bite, and not in any part of the Body, which hath at all times a mortall property: Thus the mad-

madness of a Dog makes his teeth Poysonous, which before were not so: And Authors of good repute supply us with instances of hurts in themselves, free from danger, that have been made fatal by a Poyson created by the fiercenisse of the enraged (though not otherwise poysonous) Creatures that inflicted them. And Baccius, if I mistake not, in his Treatise De Venenis, tells us a memorable Story (whereof he affirms himself to have been an eye-witnesse) of a Man who was killed within three days, by a slight hurt received in his left hand, from an enraged Dung-hill Cock: And that no parts of the Viper have any constant inherent Poyson in them, I have been induced to suspect upon this Experiment, That dissecting somelive Vipers, there came in accidentally a strange Dog, to whom I gave the Head, Tail, and Gall (which are the parts supposed to contain the Poyson) of one of them, & the Head and Gall of another, wrapt up in meat, after which, I locked the little Dog up in my own Chamber, and watched him, but found not that he was sick, or offered to vomit at all, but only lapped up greedily some drink which he espied in the Room; nor was he alone very jocund, for divers hours that I kept him in, but liked his entertainment so well, that he would afterwards, when he met me in the Street, leave those that kept him to fawn on and follow me. And having since related this Experiment to an inquisitive Friend of mine, he assured me, That to satisfy himself further in this particular, he gave to a Dog a dozen Heads and Galls of Vipers, without finding them to produce in him any mischievous symptome: To which I shall adde, That the old Man, you know, that makes Viper Wine, does it (as himself tells me) by leaving the whole Vipers, if they be not very great, perhaps for some months, without taking out the Galls, or separating any other part from them in the Wine, till it hath dissolved as much of them as it can.

And though it may seem somewhat improper, whilst we are discoursing of Poysons, to insist on a remedy against them; yet the mention of Vipers recalling into my minde a memorable Ex-

A certain Cure
for the biting
of Vipers.

periment which I tryed against the biting of Vipers, I shall choose rather to decline the dictates of Method, then those of Charity, which forbids me to suppress a remedy that may possibly rescue from sudden death, a Person or other fit to live, or unprepared to dye; because it does not strictly belong to the Theme whereto it is referred. The remedy then is this, that as soon as ever a Man is bitten (for if the Poyson have had time enough to diffuse it self, and gain the Mass of Blood, I doubt the Experiment will scarce succeed) a hot Iron be held as near the place as the Patient can possibly endure, till it have, as they speak, drawn out all the Venom: which Eye-witnesses assure me (for I have not yet seen that myself) will sometimes adhere like a yellowish spot to the surface of the Iron. But being upon competent grounds satisfied of the Experiment, to convince a Physician that mistrusted it, I last Summer hired a Man (who doubted it as little as I) to suffer himself to be bitten by a Viper; and having in the Physicians house and presence, picked out of a good number of them one of the blackest I could finde (those of that colour being supposed the most mischievous) and commanded the fellow to provoke and anger it (which to my wonder he did, a pretty while before the beast would fasten on him) At length being by his very rude handling thoroughly exasperated, it bit him with great fury, as it seemed; for immediately his hand began to swell, and the injured part was grown tumid before we could take from the Fire, which was bard by, a knife that lay heating there; and having applyed it as near as he could suffer it, for about ten or twelve minutes, we found that the swelling, though it decreased not, did not spread; and the Man glad of his money, without further Ceremony, went about his affairs, and told me since, That though the tumor continued a while, he had no other inconvenience attending it, and hath divers times got money by repeating the Experiment, though otherwise, by the casual bitings of Vipers, he hath been much distressed, and his Wife almost killed.

But,

But, *pyrophilus*, to return to the Experiments of Poysons made on Beasts, we could wish Physicians were more diligent to make tryals of them, not only by giving Beasts Poysons at the mouth, but also by making external applications of them, especially in those parts where the Vessels that convey Blood more approach the surface of the Body, and also by dexterously wounding determinate Veins with Instruments dipt in Poysons (especially moist or liquid ones) that being carried by the circulated Blood to the Heart and Head, it may be found whether their strength be that way more unfringed, and their operation more speedy (or otherwise differing) then if they were taken in at the mouth. For I remember sober Travellers have shewed me some *Indian* Poysons, whose noxious efficacy they affirmed to be by great intervals of time, differingly mortal, according as the slight hurt made by the points of Arrows, infected with them, did open a capillary or larger Vein, and were inflicted on a part more or less distant from the Heart; but having not yet made any tryal of this my self, I dare not build upon it. Yet I finde that the formerly commended *Olearius*, in his Travels into *Muscovic* and *Persia*, takes notice of a venomous Insect in *Persia*, which the Natives call *Encureck*, and which he (how justly I know not) makes to be a kind of *Tarantula*, because it is, as that Creature, in shape almost like a Spider, and speckled, though of twice the bignesse of a Thumb: This Insect (says he) instead of stinging or biting, lets his Venom fall in form of a drop of Water, which immediately produces insufferable pains in the part to which it fastens; and suddenly penetrating, as far as to the Stomach, sends up vapors to the Head, which sends again (to use his expression) so profound a sleep to all the Patients limbs, that it is impossible to awaken him, but by one only Remedy, which is to crush one of these Creatures upon the

Of external Application of Poysons and letting them into the veins of Beasts.

Voyage de Moscovic & de Perse, pag 334.

hurt, whence he abstracts all the Poyson. Some horrid and unusual symptomes of this Venom, which yet agree not so well with those that are wont to be produced in Persons bitten by *Tarantula's*, our Author proceeds to mention, and furnishes us with a proof of what we were lately saying, when we told you that some things were poysonous to Men, which were not to some Beasts: by adding, as an admirable singularity, that the Sheep of those parts do not only eat these fatal Insects, but seek for them. I know also, by sad experience in my self, what an outward application even of *Cantharides* can do; for having occasion to have a large blister drawn on my Neck, the Chirurghion I employed, unknown to me, made use of *Cantharides*, among other Ingredients of his vesicating Plaister, which a few hours after I had taken it, waken'd me with excessive torment, to which it put me about the neck of my Bladder, so that I apprehended it might proceed from some Stone unable to get out; of which suddain and sensible pain, after I had a while in vain conjectured what might be the cause, I at length suspected that which was indeed the true one; and having sent for the Chirurghion, he confessed to me, upon my demand, that he had put some *Cantharides* in his Plaister, not thinking it would have had such an operation: whereupon I soon reliev'd my self, by drinking new Milk very well sweetned with Sugar-candy.

P O S T S C R I P T.

TO enable you, *Pyrophilus*, to gratifie those inquisitive Persons that have heard some, and yet but an imperfect Report, of a much noised Experiment, that was some Years agoe devised at *Oxford*, and since tryed in other places before very Illustrious Spectators, I am content to take the occasion afforded me, by what was in the foregoing Essay lately mention'd

tion'd concerning the Application of Poysons, to inform you; That a pretty while after the writing of that Essay, I happen'd to have some Discourse about matters of the like Nature, with those excellent Mathematicians, Dr *J. Wilkins*, and Mr *Christopher Wren*; at which the latter of those *Virtuosi* told us, That he thought he could easily contrive a way to convey any liquid Poyson immediately into the Masse of Blood. Whereupon, our knowledge of his extraordinary Sagacity, making us very desirous to try what he proposed, I provided a large Dog, on which he made his Experiment in the presence, and with the assistance of some Eminent Physicians, and other Learned men: His way (which is much better learned by sight then relation) was briefly this: First, to make a small and opportune Incision over that part of the hind-leg, where the larger Vessels that carry the Blood, are most easie to be taken hold of: Then to make a Ligature upon those Vessels, and to apply a certain small Plate of Brasse (of above half an Inch long, and about a quarter of an Inch broad, whose sides were bending inwards) almost of the shape and bignesse of the Nail of a Mans Thumb, but somewhat longer. This Plate had four little holes in the sides, near the corners, that by threads passed thorow them, it might be well fastened to the Vessel: And in the same little Plate there was also left an Aperture, or somewhat large Slit, parallel to the sides of it, and almost as long as the Plate, that the Vein might be there exposed to the Lancer, and kept from starting aside. This plate being well fastened on, he made a Slit along the Vein, from the Ligature towards the Heart, great enough to put in at it the slender Pipe of a Syringe: By which I had proposed to have injected a warm solution of *Opium* in Sack, that the effect of our Experiment might be the more quick and manifest. And accordingly our dexterous Experimenter having surmounted the difficulties which the tortured Dogs

Experiments of conveying liquid poysons immediately in the Mass of blood.

violent struglings interposed, conveyed a small Dose of the Solution or Tincture into the opened Vessel, whereby, getting in o the mass of Blood (some quantity of which, 'tis hard to avoid shedding in the operation) it was quickly, by the circular motion of That, carryed to the Brain, and other parts of the Body. So that we had scarce untied the Dog (whose four feet it had been requisite to fasten very strongly to the four Corners of the Table) before the *Opium* began to disclose its Narcotick Quality; and almost as soon as he was upon his feet, he began to nod with his head, and falter and reel in his pace, and presently after appeared so stupified, that there were Wagers offered his Life could not be saved. But I, that was willing to reserve him for further observation, caused him to be whipped up and down the Neighboring Garden, whereby being kept awake and in motion, after some time he began to come to himself again; and being led home, and carefully tended, he not only recovered, but began to grow fat so manifestly that 'twas admired: But I could not long observe how it fared with him. For this Experiment, and some other tryals I made upon him, having made him famous, he was soon after stoln away from me. Succeeding attempts informed us, that the Plate was not necessary, if the Finger were skilfully employed to support the Vessel to be opened; and that a slender Quill, fastened to a Bladder, containing the matter to be injected, was somewhat more convenient than a Syringe; as also that this notwithstanding, unless the Dog were pretty big, and lean, that the Vessels might be large enough and easily accessible, the Experiment would not well succeed: The Inventor of it afterwards practised it in the presence of that most Learned Noble-man, the Marquess of *Dorchester*, and found that a moderate Dose of the infusion of *Crocus Metallorum* did not much move the Dog to whom it was given: but once that he injected a large Dose (about two Ounces

Ounces or more) it wrought so soon, and so violently upon a fresh one, that within a few hours after he vomited up Life and all, upon the Straw whereon they had laid him. I afterwards wished, that not only some vehemently working Drugs, but their appropriated Antidotes or else powerfull liquid Cordials) and also some altering Medicines, might be in a plentiful Dose injected. And in Diureticks a very ingenious Anatomist and Physician told me, he tryed it with very good success. I likewise proposed, That if it could be done, without either too much danger or cruelty, tryal might be made upon some humane Bodies, especially those of Malefactors. And some Moneths after, a forreign Ambassador, a curious Person, at that time residing in *London*, did me the honour to visit me, and inform'd me, That he had caus'd tryal to be made, with infusion of *Crocus Metallorum*, upon an inferior Domestick of his that deserv'd to have been hang'd; but that the fellow, as soon as ever the Injection began to be made, did (either really or craftily) fall into a Swoon; whereby being unwilling to prosecute so hazardous an Experiment, they desisted, without seeing any other Effect of it, save that it was told the Ambassador, that it wrought once downward with him, which yet might, perhaps, be occasioned for fear or anguish: But the tryals of a very dexterous Physician of my acquaintance in humane Bodies, will perhaps, when I shall have received a more circumstantial account of them, be not unwelcome to you. And in Dogs, you may possibly from our own Observations, receive a further Account of an Experiment, of which I now chiefly designed but to relate to you the Rise and first Attempts.



E S S A Y III.

*Containing some Particulars relating to the
Semeiotical Part of Physick.*

THe *Semeiotical* part of the Physicians Art, seems capable of the least improvement by Natural Philosophy. In which yet, *first* the Naturalist may, by illustrating the Anatomical and Pathological parts, assist the Physician to make more certain conjectures from the signs he discovers of the constitution and distempers of his Patient. For you will easily believe that *ceteris paribus*, he that better knows the nature of the parts and juices of the Body, will be better able to conjecture at the events of Diseases, than he that is less skilled in them. And *secondly*, The Naturalist by improving the *Therapeutical*, may, at least, much change and alter the Prognosticks of the duration, ferocity and event of Diseases. For, *Pyrophilus*, it would be considered, that the Predictions hitherto current in Authors, and commonly made by Physicians, suppose the use of the received Remedies, and the dogmatical method of Physick; but if there were discovered such generous and commanding Medicines, as, by powerfully assisting Nature, or nimbly proscribing the Morbifick Matter that doth either produce or (though produc'd by them) cherish Sicknesses, might enable Nature to hinder the Disease from continuing its course, and acting almost all the
Scenes

That the improvement of the *Therapeutical* would alter the prognosticks in the *Semeiotical* part of Physick.

Scenes of its Tragedy in the Body ; Physicians need not in acute Diseases wait so often for a *crisis* to instruct their Prognosticks ; and the threatening Symptoms of Chronicall Distempers would often prove false Prophets.

To illustrate this but with a not ignoble instance, give me leave to tell you , That when that *Peruvian* Barke, that now begins to be somewhat taken notice of, under the name of *The Jesuits Powder*, had scarce been so much as heard of in this part of *Europe* , I went to visit a *Virtuoso*, who had been for some Months afflicted with a Quartan Ague, so violent and stubborne, that it had frustrated the skill, and almost tyred the endeavours of the most eminent Doctors of this Nation; of one of which, who was then accidentally with his Learned patient, I enquired how my Friend did, and was answered, That he hoped he would recover when the Season would give him leave ; but in the Winter he knew no Quartans cured. Yet the Gentleman acquainting me with his having procured some of the *American* Barke against Agues, which we mentioned in a former Essay, and I (after having tasted and considered it) having encouraged him, as I have others , to make Tryall of it, as the strange Effects I have observ'd of it, hath divers times invited me to do : The candid and learned Doctor, not onely opposed not my perswasions, but added his owne to them. And my Friend taking two Doses of this powdered Barke though it were at the unhopefull Season of the Year (the Winter Solstice) and though he scarce found any sensible operation (unlesse a little by sweat) of the *Peruvian* Medicine, had by the first Dose his Fit very much lessen'd, and by the second quite removed. And though through some irregularities of Dyet (to which that keen Appetite, like that of recovering persons, which I have observ'd this powder to be wont to produce, tempted him) he did, as I then foretold him he would, after missing eight or ten Fits, relapse; yet by the

An instance to that purpose in the *Peruvian* Barke.

h

repeated

repeated use of the same Remedy, he againe recovered, and hath continued so ever since. Having also lately perswaded the use of the same Medicine, in the same Disease, to one of the greatest Ladies in this Nation, she told me the other day, That it immediately, and in unlikely weather, freed her from those Fits, from whence she dispaired to be delivered till the Spring. Having likewise sent some of it to a couple of Gentlemen, sick of the like Malady, I had word brought me, That the one had missed his Fits for a Month, though in the midst of Winter; and the other was by the first Dose cured, and continues so. And diverse eminent Physicians, to whom I have commended the Specifick, have used it with such successe, that one of the severest of them, though he had formerly dispaired it, confessed to me, that in a short time he tried it upon eight or nine severall Persons, without finding it to fail in any, though one of them especially, were, before he was called, judged irrecoverable: the obstinate Quartan being complicated with other almost as dangerous Distempers. And I confess, I somewhat wonder that Men have not the Curiosity to try the efficacie of this powerfull Bark, in other Diseases than Agues: It being highly probable, That a Medicine, capable to prevaile so strongly against so obstinate a Disease, as a Quartan (wherein most commonly divers of the considerable parts of the Body are much affected) cannot be uselesse to severall other Distempers. I deny not that those that have taken this Powder, have divers of them, after having missed six or seven Fits, relapsed into them (as it likewise happened to one of the Gentlemen I sent it to) yet (as I have elsewhere told you) it is much, and more than any common Remedy does to stop the Fit so long. Nor is it a small matter to be able to give the Patient so much breathing time, and allow the Physician the opportunity of imploying other Remedies. And the Relapses we speake of are commonly cured by

by the same Powder: And we have knowne them prevented, when the Medicines hath been administred, not by unskillfull Persons, but by a prudent Physician who knowes how to assist it, by opening and gently purging Physick. Wherefore that which I should be most gladly be satisfied of, about this Remedy, is, whether or no it do indeed either proscribe the Morbifick Matter, or so alter its Texture as to make it harmlesse; or else, whether it doth secretly leave such noxious Impressions upon the Spleen, Guts, or some other important Part, as may shorten Life, by producing in proesse of time, either the Scurvy, or the Dropsie, or some other formidable disease. But because the Resolution of this Doubt must be a worke of time, we must at present refer it to future Observation; And therefore shall now subjoyne, that if the famous *Riverius* have not, in his learned Observations, flattered his owne *Febrifugum*, whatever he resolved touching this *Indian Bark*, there will not want a safe remedy which may allow Physicians to make more chearfull Predictions about the lastingnesse and event of Quartans, than have hitherto been usuall.

And in *Riverius's Febrifugum*, and a new Cure of the Kings Evill.

Riverius's is Observat.

How painful and stubborn a Disease the Kings Evil is wont to prove, is scarce more knowne, than that 'tis seldome cured without a tedious course of Physick: And yet, by the Herbmⁿ mention'd in one of the former Essayes, the young Gentleman there spoken of, was cured in a short time, and with little or no * paine or trouble. And that these are not the only Diseases in which Observations, tending to our present purpose, may be made the following part of this Treatise will afford you opportunity to observe.

* Vide infra cap. 9. p. 204.

I might adde, *Pyrophilus*, that I was lately visited by an ancient Chymist, enobled by divers eminent cures, who promisseth to me an Experiment of making very unusuall, and yet rati^onall Predictions in some abstruse Diseases, by a peculiar way of examining the patients Urine. But because

Chymists have written extravagantly enough upon a like Subject; and because I have not yet made or seen the Experiment of it my self, I dare not yet give this new method of foretelling, for an instance of the Usefulness of Natural Philosophy to the Semeiotical part of Physick. Though I dare not deny but by precipitations, and some other wayes not yet vulgarly practised of examining the Urine, made by the same Patient at several times, before, in, and after some notable alteration in his Body, divers things (especially in Feavers, and other acure Diseases) relating to the state of it, may be discover'd, especially if thereto be added a skilful and Seasonable Chymical *Examen* of the other Excrements, and vitiated Substances of the Patients Body.

That though
no disease
should be in-
curable, yet
every disease is
not curable in
every Patient.

You will perchance expect, *Pyrophilus*, that on this occasion I should handle that controversie which is so hotly agitated, betwixt the *Paracelsians* and their Adversaries, concerning the curableness of all Diseases: But, for ought I can perceive, the difference betwixt the more sober Men of both parties, is more about Words then Things, and might be reduced to a much less distance, if men could but calmly consider, That 'tis one thing to dispute, *Whether all Diseases be curable*; and another, *Whether all Persons be recoverable*: For a Disease may be called incurable, either in its own Nature, or by accident; that is, either because such a Disease is not to be cur'd in any Patient, or that it is so circumstantiated in this or that Patient as not to be naturally curable in him. Now this distinctly, duly considered, may conduce much to reconcile the two Opinions, if not the parties that maintain them: For neither would a sober *Paracelsian* affirm (though *Paracelsus* himself doth somewhere seem to do so) That every Disease is curable in every Patient; there being some Palsies, Gouts or Blindnesses, or the like; so obstinate, that especially if they are born with a Man, or inherited from his parents

rents) the tone of some necessary or considerable part of the Body, being thereby rather abolished, than barely vitiated, it were a folly to promise recovery to such a Patient. And on the other side, a moderate *Galenist*, that it is not unacquainted with the Discoveries which these latter Ages have made of the power of Nature and Art, will not be forward to pronounce (as others do, and as the *Paracelsians* tax the *Galenists* too indiscriminately for doing) That the Gout (for instance) the Dropsie, and the dead Palsie, the Stone, are diseases universally incurable: Since in the Writings of *Erastus*, and in the Observations of *Schenkius*, and others, there are Instances recorded of some Cures performed of the Dropsie, and one or two more of those stubborn Diseases, even by *Galenical* Remedies.

But, *Pyrophilus*, though we cannot but disapprove the vain-glorious Boasts of *Paracelsus* himself, and some of his Followers, who, for all that, lived no longer than other Men; Yet I think Mankind owes something to the Chymists, for having put some Men in hope in doing greater Cures than have been formerly aspir'd to, or even thought possible, and thereby engage them to make Tryals and Attempts in order thereunto. For not only before Men were awaken'd and excited by the many Promises and some great Cures of *Arnoldus de Villa nova*, *Paracelsus*, *Rulandus*, *Severinus* and *Helmont*; Many Physicians were wont to be too fogward, to pronounce Men, troubled with such and such Diseases, incurable, and rather detract from Nature and Art, than confess that those two could do what ordinary Physick could not. But even now, I fear there are but too many, who though they will not openly affirm, that such and such Diseases are absolutely incurable; yet if a particular [Patient, troubled with any of them, be presented, they will be very apt to un-

That the hope of doing greater Cures than ordinary hath engaged Artists to make profitable Tryals.

dervalue (at least) if not deride those that shall attempt and hope to Cure him.

And I am apt to think, that many a Patient hath been suffered to dye, whose Life might have been saved, if Physicians would have but thought it possible to save it. And therefore I think it were no ill piece of service to Mankind, if a severe Collection were made of the Cures of such Persons as have recovered of having been judged irrecoverable by the Doctors: That Men might no longer excuse their own Ignorance by the impotency of Nature, and bear the World in hand, as if the Art of Physick, and their skill, were of the same extent. And the Cures that seem performed by Nature herself, need not be left out of such a Collection: For still they shew what is possible to be done by natural means, to evacuate the Morbifick matter, or alter its Nature (how dangerous soever it is grown) Or how far the tone of a part, or strength of the Body may be vitiated or impaired, and yet be capable of some restitution. And such an observation I received from our most experienced *Harvy*, when, having consulted him about my weak Eyes, he told me, among other things (as a very remarkable one) that he had once a Patient (whose Name and Profession he told me, but I remember not) that had a confirm'd Cataract in his Eye; and yet upon the use of Physick, to which he could not ascribe so wonderful an effect, that Cataract was perfectly dissipated, and the Eye restored to its wonted Function. Which brings into my mind another Observation, imparted to me a while since, by that excellent and experienc'd Lithotomist, Mr. *Holtyer*, who told me, that among the many Patients sent to be cured in a great Hospital (of which he is one of the Chirurgions) there was a Maid of about eighteen years of age, who, without the loss of motion, had so lost the sense of feeling in the external parts of her

Examples of
some unexpected & strange
Cures.

her Body, that when he had, for tryall sake, pinn'd her Handkerchiefe to her bare Neck, she went up and downe with it so pinn'd, without having any sense of what he had done to her. He added, That this Maid having remained a great while in the Hospitall without being cured, Dr. Harvey, out of Curiosity, visited her sometimes, and suspecting her strange Distemper to be chiefly Uterine, and curable onely by *Hymeneal* Exercises, he advised her Parents (who sent her not thither out of poverty) to take her home, and provide her a Husband, by whom, in effect, she was according to his Prognostick, and to many Mens wonder, cured of that strange Disease. That in acute Sicknessees, Persons given over by the Physicians, may recover, the more judicious, even of those *Galenists* that are of a dispondent temper, will not deny. For not onely *Celsus* gives us this sober admonition. *Neque ignorare oportet in acutis morbis fallaces magis notas esse & solutis & mortis*; But even *Hippocrates* himselfe, who was so skilfull in Prognosticks, confesses, that *Morborum acutorum non in totum certa sunt prænunciationes neque salutis neque mortis*: Whence the French have a proverbiall saying, that *Il vaut mieux estre cendammé par les Medecins, que par le Prevost des Mareschaux*, as if in English we should say, *It is better to be condemned to dye by the Doctor, than by the Judge*. And even in Chronicall Diseases, where events are wont much better to answer Physicians predictions, there are sometimes such Cures performed, as may encourage humane Industry, and keep a sick Mans friends from forsaking the Cure of him, till Life it selfe hath unquestionably forsaken him. For not only it hath been not unfrequently seen, that divers persons, who have been given over by some Physicians, have been cured by others, perchance rather more lucky than more skilfull: But those that have been given over, and that too (sometimes rather upon the believ'd incurableness of the Disease, than the personall

Examples of
Cures of Can-
cers.

personall Condition of the Patient) even by judicious and experienced physicians, if such as are acquainted but with the ordinary Remedies, have been recovered by the use of extraordinarily powerfull, and especially, Chymicall physick. Of such Cures I have sometimes met with a few, which, because I may elsewhere relate, I shall now onely mention, on this occasion, what I have heard concerning the Cures of Cancers, performed by Dr. *Harberfeld*, one of the principall physicians of *Bohemia*. And among other relations of this kind, made me by credible persons, I cannot omit one, that was, Of a certain English Woman, of sixty and odde yeares of age, who had long lain in an Hospitall in *Zeeland*, sick of a Cancer in the Breast, and by this Doctor was, with one single inward Remedy, perfectly cured in the space of three Weekes. For this relation was made me by persons of very strict veracity, the one a Doctor of Physick, who was an Eye-witnesse of the Cure, the other a Childe of *Cornelius Drebell's*, who not onely saw the Cure, but knew the Woman before, and out of Charity brought her to him that healed her. The same persons likewise informed mee, That the Chymicall Liquor the Doctor constantly made use of, does, in the Dose, of about a spoonfull or two, work suddenly and nimbly enough by Vomit, but hath very quickly ended its operation, so that within an houre or lesse, after the patient hath taken it, he is commonly well againe, and very hungry. And they having presented mee some spoonfulls of this Liquor, I find the taste to be offensive enough, and not unlike that of Vitriol, which, by the taste and emetick operation, I guesse to be, at least, its principall Ingredient, however it be prepared. The same persons assured mee, that having obtained of Dr. *Harberfeld*, a good quantity of his Specifick, they had been (in *England*, as well as elsewhere) partly Eye-witnesses, and partly Performers of wonderfull cures by the help of it alone, under
God,

God, in the Kings Evil. Infomuch that an eminent Gentleman of this Nation, now alive and healthy, hath been cured by it, when the Kings Evil had brought his Arm to that pass, that the Chirurgions had appointed a time to cut it off. And with the same Liquor, only taken inwardly, they profess themselves to have seen and done divers Cures of inveterate external Ulcers, whose proud Flesh, upon the taking of it, is wont to fall off, and then the Ulcer begins to heal at the bottom; but of the recent effects of this Liquor, we may elsewhere, perhaps, further entertain you. That Suffusions or Cataracts, may, by a manual operation, be cured even in a Patient that was born with them, I formerly told you, when I related the Cure done by my Ingenious Acquaintance, Mr. *Stepkins*, on a Gentlewoman of about eighteen Years of age, that brought a couple of Cataracts with her into the World. And I remember I was sometime since in the company of another Woman, who told me, She was brought to Bed of five Children (if I much mistake not the number) successively; of which, she saw not any in a long while after, by reason of a couple of Suffusions, that had many Years blinded her; and yet now, by the help of a Dutch Oculist of my Acquaintance, she sees, and reads well, and hath freely enjoyed the restored use of her Eyes for some years already.

An example of the Cure of one that was born with a Cataract in the Eye.

And other Examples of Cataracts strangely cured.

But these are rather Chirurgical, then Medicinal Cures, and therefore we shall subjoyn the Mention of a very memorable Observation of the Learned *Petronius*, which being collated with that a little above recited, from Dr. *Harvey*, they may serve to keep each other from passing for incredible: *Quidam* (says our Author) *qui antequam Morbo Gallico afficeretur altero oculo cecus erat, suffusione densissima (vulgus Cataractam vocat) oculum occupante, Hydrargyri inunctione à Morbo Gallico, & à suffusione, quod maxime mirum est, evasit. Neque à ratione alienum est inunctione illa Cataractas posse dissolvi, cum*

Alexand. Trajan. Petronius. lib. 5. De Mor. Gallico, c. 1. Ad Skeckium in Observ. l. 1.

fre-

frequens Experientia doceat praeuros tumores ex pituita crassa & concreta, genitos, illis Hydrargyri potenter dissolvi.

Examples of
the Cure of
the Dropsie
and Gout,

I need not tell you what sad Prognosticks Physicians are wont to make of Dropsies, especially of that sort which they call *Ascites*: And indeed the Event does but too frequently justify their Predictions, when none but ordinary Remedies are employed. But I remember, that being acquainted with an Ingenious Person that was very happily cured of a Dropsie, and inquiring who it was that had perform'd the Cure; I was inform'd, that that, and a multitude of the like had been wrought by a *Germane* Physician, of whom, and of his Remedy, I had heard much Commendation in *Holland*, where he liv'd: And though on divers occasions I found him a modest Man; and accordingly, when I asked him concerning his Cures of the Dropsie, he answer'd me, That he neither did, nor would undertake to cure so formidable a Disease; yet he scrupled not to tell me, That as far as he had hitherto tryed, he had one Remedy which had not failed him, though he had tryed it upon Persons of differing Ages, Sexes, and Complexions. - But of this Specifick more hereafter. For, at present, I must proceed to take notice, that as incurable a Disease as the radicated Gout is thought to be (especially in Patients not very temperate) and as tedious a course of Physick as one would expect to be requisite to the Cure of it, in case it can be cured; yet I have been several times visited by an honest Merchant of *Amsterdam*, who was there noted for his Wealth, and his skill in *Art et in foriâ*: This Man, ten or twelve Years ago, had been for a long time so tormented with the Gout, both in Hands and Feet, that his Fits would sometimes vex and confine him for a great part of the Year, and not leave him without hard Knots, as unwelcome Pledges of their Return: But once, that he was tortured to a degree that made him much pityed, one came and informed him of an Emperick, who had received

received from a great Chymist who had lodg'd in his House, a Secret, with which he had already thoroughly cured many, in a short time: Whereupon sending for this Person, and offering him any thing for some relief, the other refused to take above ten Crowns, which, as it seems, was the usual rate for the Cure; and would not receive that neither, till the reality of it had been evinced by the Patients continuing above six Moneths well: And accordingly, with a very few Doses of a certain Powder and Tincture, the Merchant was quickly free'd, not only from his Pains, but from his Gouty *Tophy*: And though he indulged himself the drinking of Rhenish Wine very freely, yet he never had a Fit since, as himself assured me one Morning, wherein, for Exercise sake, he walked five or six Miles to give me a Visit; adding, That the Man that cured him, dying suddenly, never could discover what the Secret was, wherewith so many had been freed from a Disease that does so often mock the skill of the greatest Doctors.

I might, perhaps, if I had leisure, relate to you some other strange Stories; which may invite you to think, That as the Naturalists skill in Chymistry, and other Arts retaining to Physiology, may much assist him to discover more generous Remedies than are yet usual; so the Knowledge of such Remedies may, in divers cases, make a happy Change in the Rules of Prognosticating what will prove the Course and Event of a Sickness. But I shall not, at present, particularly consider any more than one Disease, namely, The Stone in the Bladder. For whereas it is by most, even of the judicious Physicians, unanimously pronounc'd incurable by Physick, in what Person soever, if it deserve the name of a Stone, and be too big to be voided whole, the Remedifness of this Disease may be justly questioned. I remember the famous *Morardes*, treating of the Seed of a *Peruvian* Plant, which they call *Chalchoos*, tell us, That it is highly esteemed by the Inhabitants

Country Gentleman, whom going to visit last Summer, he saw a Load of *Perficaria*, or *Arsmart*, brought to him by some of the Country People; and desiring to know what he intended to do with so vast a quantity of it, the Gentleman replied, That he yearly used as much, having by the Water of it, made by bare distillation in a common Rose-water Still, cured so many of the Stone, even in the Bladder, that he was usually solicited by Patients, numerous enough, to exhaust all the Liquor which he yearly prepared.

The use of *Perficaria* for that Cure.

What we, *Pyrophilus*, have observed concerning this excellent Liquor, of which we use to prescribe a draught every morning for some Moneths together, we may elsewhere have occasion to relate. But now we shall go on to tell you, that being some years since in *Ireland*, I met with an ancient Emperick, who was very famous in those parts, for cutting of the Stone of the Bladder, and for curing sore Eyes: This Man having given (in the Parts where I then was, and whilst I was there) some good proof of his skill, I sent for him to me, upon the account of a suspicion I long had of the Stone in the Bladder, which, upon search, he assured me I was free from, and so (God be praised) I have afterwards found it. He was more a Traveller than a Scholar, and yet finding him, to my wonder, very modest and sober, I inquired of him, Whether he had never any where met with a Remedy that could dissolve the Stone in the Bladder, offering him much more for a Cure of that kinde, then he would require as a Lithotomist: He answered me, That he could cure no Man of a confirmed Stone, but by the help of his Knife; but if the Stone consisted of a lump of a Gravel not very firmly cemented together, he had, by a certain inward Remedy he used, and a dexterous way of crushing the Stone from without with his Fingers, so broken the Stone, partly by crumbling it, and partly by dissolving the Cement, as to make it voidable by Urine. And

he added, That he had formerly cured a Citizen of *Cork*, of a good large Stone of the Bladder (for where I then was, he gave a proof of his skill, in telling before-hand those he was to cut, the bigness and shape of the Stones that troubled them.)

Instances in
other happy
medicines for
the same Di-
sease.

De Lib. 4. 7.
H. 14.

Passing afterwards by *Cork*, I sent an intelligent-Servant to inquire after this Citizen; but he being casually absent, his Wife sent me, by my Man, a Relation very agreeable to that which he had made me: The Receipt I purchased of him, and though it seem not very artificial, yet I suppose you will not quarrel with me for annexing so experienced a one, to the end of this Essay. But because this Remedy needed the assistance of manual operation, We shall further proceed to tell you, That *Cardan*, as he is quoted by *Helmont* (for I have not now his Works by me) relates, That in his time there rambled a Man over *Lombardy*, who did commonly, and in a few dayes, by a certain Liquor which he administered to his Patients, safely, speedily, and certainly, cure those that were troubled with the Stone in the Bladder: Adding (saith *Helmont*) his Judgement, That he doubted not of this Mans being in Hell, for having, when he dyed, envyed Mortals so excellent an Art.

I insist not on the Testimony that the same *Helmont* gives to *Paracelsus* of his curing the Stone, though he often handle him very severely in other places of his Writings, because that the Epitaph of *Paracelsus* (out of which he labours to prove his having cured the Stone) makes no expresse mention of it. Nor shall I enumerate those Passages from whence the same *Helmont's* Followers collect, That he himself was able to cure that Disease, by the resolution of *Paracelsus* his *Ludus*; but this experience hath evinced to me, that a much slighter preparation of that Stone, then was mentioned by *Paracelsus* and *Helmont*, hath been able to do more in that Disease than a wary
Man

Man would readily believe. But to detain you no longer on this subject, I shall only adde, That *Wilhelmus Laurembergius*, a learned Physician, and Professor at *Rostoch*, hath told the World how he cured himself of a confirmed Stone of the Bladder, by the use of prepared *Millepedes* (by some in English-called *Woodlice*) and other Remedies, which he hath particularly recorded in the History which he hath published, and I have seen of this admirable Cure: which having been epitomized by *Sennertus*, and other eminent Physicians, I shall not need to insist on it. And the Arguments alladged (even by the most Judicious) against the cureableness of the Stone, though very plausible, seem not to me unanswerable; for whereas first, they appeal to the innumerable fruitlesse attempts that have been made to cure great Princes, and rich Men, without cutting, that Argument drawn from experience, may, by the former Experiments, be answered; especially since *Horatius Augenus* (upon whose account *Laurembergius* tryed *Millepedes*) tells us, not only that he cured a young Man at *Rome*, that was going to be cut of the Stone, but that the Jesuite that chanced to confesse this Youth, and perswaded him to the use of *Millepedes*, had experimented their efficacy both upon himself and others: And indeed, we our selves have found them to be highly Diuretick and Aperitive.

The use and
success of *Mil-
lepedes*.

And whereas it is next objected, That Medicines must necessarily lose their efficacy before they can reach the Bladder, I confesse, that for the most part, it is very true: But yet that it is possible for some Medicines to retain their Nature, after many alterations and digestions, we have elsewhere declared. And in our present Case, we not only find that Turpentine and Asparagus, do manifestly affect the Urine (as I have often observed in my own, and almost any Man may observe it in

The Argument concerning the Incubation of the Stone answered.

in his) But that which is most to our purpose, *Rubarb* tinges the Urine of those that have taken any quantity of it. And lastly, whereas it may be yet further alleadged, That not only there hath not been yet a Liquor found capable of dissolving so solid a Body as a Stone; but if there were, it must necessarily be so corrosive as to destroy the Patient, by fretting his Stomach, or Guts, or Bladder, which are parts so much more tender. To the first part of this plausible Objection it may be replied; That even good Vinegar will dissolve, not only those stony Concretions, call'd *Lapides Cancrærum*, which, like the *Calculi* we treat of, are formed in the Bodies of Animals; but even the more hard and solid Body of Coral, which will lose but little of its weight, in a Fire that would waste a great part of the *Duclech*: And that the bare Juices of Vegetables (such as Lemmons and Barberies) will readily dissolve both Pearl and Coral, is known even to the Apothecaries Boyes. Indeed what *Paracelsus* and *Helmont* relate of their *Alkabeft*, with which they prepare their Specifick against the Stone, and with which the later of them, if not both, pretend to be able to reduce, not only the Stone they call *Ludus*, but all other Stones, Vegetables, Minerals, Animals, &c. into insipid Water, is so strange (not to say incredible) that their Followers must pardon me, if I be not forward to believe such unlikely things, till sufficient experience hath convinced me of their truth.

But yet I must not conceal from you, That a Chymist, whom you have often seen, advised with me several times about the way of preparing this immortal Liquor (as *Helmont* calls it) and that, when we had agreed that such a way was the most promising, he prosecuted it so long, and so industriously, that at length he obtain'd, & shew'd me a Liquor, which (though it seem'd to me far short of the *Alkabeft*) I confess I

ad-

admired; and not I alone, but our Ingenious Friend Dr. C. (who had been imployed into severall parts of *Europe*, by a rich and curious Princes to purchase Rarities) agreed with this Chymist, to give Two hundred Crowns for a Pint of this *Menstruum*, and confessed to me withall, That he saw him, with this Liquor, not only dissolve common *Sulphur*, and bring it over the Helm, but reduce Antimony into sweet Chrystals, with a few of which it was, that he (I mean Dr. C.) to the wonder of many, did, without Purge or Vomit, cure our good Friend Sir C. C. of a very radicated and desperate Disease as the restored Patient soon after told me. And to the second part of this Objection it may be answered, That if we knew and considered well, how many of the operations of Natural Bodies depend upon the suitableness and difference of the Figures of their Parts, and the Pores intercepted between them, the number of impossibilities would not, perhaps, be thought so great, as by many Learned Men it is.

That it is very possible for a Body to have an effect upon another determinate Body, without being able to operate in like manner, upon a multitude of other Bodies, which may seem more easie to be wrought on by it; may appear by the Load-stone, which will draw and work only upon Iron, and (which is but refined Iron) Steel, but not upon wood or straws or any of those innumerable Concrets that are lighter, and of a more open texture than the heavy and solid Body which it attracts. And to give you an instance that comes nearer to our case, Quick-silver, that will not corrode our skin, nor so much as taste sharp upon our tongue, will yet readily dissolve that most compact Body of Gold, which even *Aqua fortis*; that can insinuate it self into all other Metals, and corrode them, will not meddle with; though the same Quick-silver will not dissolve Iron, which yet *Aqua fortis* will very nimbly

That there may be a liquor able to dissolve the Stone, that may not be corrosive to any other part.

fret asunder. So that although I dare not confidently believe all that I have found averr'd even by eminent & learned Chymists, of their having made or seen Liquors, which, without appearing any way sharp to the Tongue, would dissolve Gold and Silver, and other hard compact Bodies; because I have not yet, my self, seen any severe and satisfactory tryal made to evince the efficacy of insipid Dissolvents: yet, by reason of divers things I have read and heard, and of some things too I have seen, I dare not peremptorily deny the possibility of such *Menstruums*. And who knows, but that in Nature there may be found, or by Art there may be prepared, some Liquor, whose parts may have such a suitableness to the Pores of a humane *Calculus*, as those of Quick-silver have to the Pores of Gold, and yet may as little work upon the rest of the Body, as we have observed the same Quick-silver to do upon Iron (which yet is a much more porous and open Metal) even when it hath been distill'd in Iron Vessels? And as to that part of the Objection wherein the strength of it chiefly lyes, let me tell you, *Pyrophilus*, that I have sometimes, for curiosity sake, taken an Egge, and steep'd it in strong Vineger for some dayes, and by taking it out, and shewing that the shell was so eaten away, that the Egge could be squeez'd into unusuall Forms, but the thin skin that involves the white continued altogether unfretted, I convinced an Ingenious Man, that the operation of Dissolvents are so determin'd by the various textures of Bodies on which they are imploy'd, that a Liquor, which is capable to corrode a more hard and solid Body, may be unable to fret in the least, another more soft and thin, if of a texture indisposed to admit the small parts of the *Menstruum*. And I must confesse to you, *Pyrophilus*, That one thing, among others, which hath made me backward to affirm with many Learned Men, that there can be

no

no potent Dissolvent that is not corrosive enough to fret in pieces the parts of a humane Body, hath been a Story, which I divers yeares since chanc'd to meet with in the Learned *Senertius's Paralepomena*, where, though he relates it to another purpose, yet it is so pertinent to our present designe, and in it selfe so singular, not to say matchlesse, that I cannot forbear to mention it here on this occasion. He tels us then, That in the end of the Yeare, 1632. *Johannes Nesterus*, an eminent Phisician, and his great Friend, informed him, That there liv'd at that time in the Neighbourhood, and belonging to a Noble Man of those parts, a certaine *Loratner*, whom he also call'd *Claudius*, somewhat low and slender, and about 58. Yeares of age: *Hic* (saith he) *nihil fastidum, nihil injucundum abhorret; Vitra, Lapides, Ligna, Carbones, Ossa, Leporinos, & aliorum animalium pedes cum pilis, lineos, laneosq; pannos, viva animalia & pisces adhuc salientes, imò etiam Metalla, patinas & orbes stanneos dentibus confringere & vorare sapissimè visus est; Vorat præterea lutum, serum & candelas sebaceas, integras testas coctearum, animalium Stercora, cum primis bubulum calidum adhuc, prout è matre venit: potat aliorum Urinas cum Pino & cerevisia mixtas; Vorat sænum, stramen, stipulas & nuper duos mures viventes adhuc deglutivit, qui ipsius ventriculum ad semihoram usque creberrimis moribus lancinarent, & ut brevibus completar, quicquid illi à Nobilibus devorandum offertur, vilissimâ mercede propositâ, dictum ac factum, ingurgitat, ita ut intra paucos dies integrum vitalum crudum & incoctum cum corio, & pilis se estaturnum promiserit. Testes inter alios quamplurimos ipse ego sum, quippe qui, &c.* To this and the following part of the Letter, *Senertus* addes, That not having, during some yeares, heard any thing concerning this *Claudius*, he sent about foure years after to the same Phisician, Dr. *Nesterus*, to enquire what was become of him; and

Examples of those who could digest metals and Glasse,

*Medicus
Rosblizenfis*

that the Doctor sent him back a Letter of the Minister of the Church of that place, by way of confirmation of all the formerly mention'd particulars, and answered himselfe, That the *Lorainer* whom he had long hop'd to dissect, was yet alive, and did yet devour all the things mentioned in his former Letter; but not so frequently as before, his Teeth being growne somewhat blunter by age, that he was no longer able to break Bones and Metals. Some other examples of this nature, though none so strange, we have also met with in Writers of good credit, and especially that of the Glasse eater, recorded by *Columbus* in his excellent Anatomical Observations; of which also *Sennertus* makes mention, as we shall see by & by, and with which we may elsewhere entertaine you to another purpose. And not long ago there was here in *England* a private Souldier (who, for ought I know, is yet alive) very famous for digesting of Stones: And a very inquisitive Man that gave me the accuratest account I have met with concerning him, assures me, That he knew him familiarly, and had the curiosity, to keep in his company for 24. houres together to watch him, and not onely observ'd that he eat nothing in that time, save Stones (or Fragments of them) of a pretty bignesse, but that his grosse Excrement consisted chiefly of a sandy Substance, as if the devoured Stones had been in his Body dissolved and crumbled into Sand. But let us not omit, that to the second Epistle above-mentioned, *Sennertus* addes this Reflection, not impertinent to our purpose: *Causam* (saies he) *hujus voracitatis, etiam in cadavere, invenire proculdubio erit difficillimum. Posset quidem ad illud, quod in cadavere Lazari Viri voracis observavit Columbus, quidam confugere; & statuere quartam illam nervorum conjugationem, qua gustus gratia in hominibus a natura producta est, neq. ad Palatum, neq. ad Linguam pertendere. Verum hoc modo saltem gustus aboliti causa redderetur,*
non-

nondum verò causa daretur, cur res tam miras assumere sine ventriculi lassione, imò concoquere potuerit. Qua proculdubio in idiosyncrasia & peculiari constitutione ventriculi & intestinorum querenda esset: qua tamen oculis investigari non potest, sed saltem ex effectu patet. And indeed this memorable story seems to argue, not only what we have already alleaged it to prove, but also that a *Menstruum* not so corrosive as to fret the Body, may dissolve Stones, Metals, and other compact Substances. And since one Liquor, prepar'd by Nature only, could in this Mans Stomack dissolve that great variety of Bodies above enumerated, why should it be thought that the Alkahest, or some other *Menstruum* wherein Nature is skillfully assisted, and to the utmost heightned by Art, should not be able to dissolve Concretes of very differing Textures. For though Chymists must acknowledge that such common *Menstruums* as will dissolve one Body, will not oftentimes meddle with another; as *Aqua fortis* will dissolve Silver, and not Gold; and if by *Sal armoniack* you turne it into *Aqua Regis*, it will indeed dissolve Gold, but then it will not Silver: Yet since that may be supposed to proceed rather from our want of skill to prepare the most potent *Menstruum*, than from the impossibility of one *Menstruum's* dissolving great variety of Bodies; Why may not Nature and Art afford a *Menstruum*, whose variety of Parts and Figures, and (perhaps also) Motion, may give it ingresse into Bodies of very differing Textures? as in our former Instance, though *Aqua Regalis* will dissolve Gold, not Silver; and *Aqua Fortis* Silver, but not Gold; yet Quick-silver will dissolve both, and Copper, Tin, and Lead to boot.

If I were not at present under some restraint, I might tell you some things that you would, perhaps, thinke no weak Confirmations of the past Discourse: And however, since I

The description
of a Men-
struum prepa-
red from a
common bread,
able to draw
tinctures from
precious stones,
Minerals, &c.

have observed it to be the maine thing that keeps judicious Men from seeking, or so much as hoping for nobler Dissolvents, that they are scarce to be perswaded there can be considerably piercing *Menstruums*, that are not so proportionably corrosive: I will here acquaint you with a Liquor, that may, I presume, assist you to undeceive some of them. We take then ordinary household browne Bread (I like that of Rye, but I have divers times used that of Wheat) and when it is cut into slices, and somewhat dried, we almost fill a glasse Retort with it, and placing that in a sand Furnace, by degrees of Fire, we draw off what will be made to come over, without much difficulty: The Oyle, as uselesse to our purpose, being by a Tunnel, or a Filter, severed from the rest of the Liquor, we also, by a gentle heat, free the Spirit from some of its Phlegme, which yet sometimes we find no great necessity to do. And yet this Spirit which you will easily believe is no such Corrosive as *Aqua fortis*, or other distill'd Liquors of minerall Salts, will worke upon the hardest sorts of Bodies, and performe things that Chymists counted of the judiciousest, would not have us expect from the most sharpe and corrosive *Menstruums* now in use. For with this we have, in a short time, and that in the cold, drawn Tinctures (which is done by the solution of the finer parts of the Concrete) not only from crude Corals, & some of the more open Minerals, but likewise from very hard Stones, such as Blood-stone, and Granates (even unpowder'd); Nay, and though Rubies seeme to be the hardest Bodies yet knowne, save Diamonds (for I have learned from those that cut precious Stones, that they can grinde other Gems with the powder of Rubies, but not these with any Powder, save their owne, and that of Diamonds) yet have, even these, afforded me in the cold, a not ignoble Tincture. And not to anticipate what I may elsewhere have occasion to tell you concerning the

the efficacy of this *Menstruum*, which is the same that I have intimated, without naming it, in the last, and another of the former Essays: I shall now onely adde, That an expert Chymist assures me, he hath, but tells me not how, done greater matters with it, or the like; and that to satisfie my self that these high Tinctures, proceeded not from the standing or digestion of the *Menstruum* (as we elsewhere observe concerning some other Liquors) I not only tryed, that from some Minerals it will draw a much higher Tincture than from others, and from some scarce any at all, but that it would, if kept by it self, for many Months continue clear and limpid. What further use I have made, or think others may make of this odde *Menstruum*, I must not, as I said at present, express, but returning to what I was discoursing concerning the cure of the Stone, annex, That besides what hath been objected against the possibility of making a Liquor, which, without being highly corrosive, can be able to work upon Stone; It may indeed be also alledged against the hopes we seem to countenance, that what hath cured the Stone in one Mans Bladder, may be unable to do the like in anothers. But first, the truth of that hath not been proved; and next, we highly value those Specificks that can remove Agues, Fluxes, and the like Diseases, though scarce any of them do alike succeed in all Patients, especially so as to secure them, during their whole lives, from ever relapsing into the like Disease; and besides all this, it will be no small matter to finde that the Disease, in its own nature, is not incurable; and it would recompence Mens Industry to be able to free, even a few Patients, from so painful and stobborn a Disease. Which I have rather than any other, chosen to insist upon, because it is so generally believed not to be curable by inward Remedies in any Person whatever.

But

Helmont's Argument from the Providence of God censured.

But I have entertained you so long on this subject, that I must reserve, for some other opportunity, what I have to say to you concerning the Dropsie, and some other Diseases, commonly put into the Catalogue of the incurable ones, and therefore shall now only tell you in general, That as on the one side I think the Arguments which *Helmont* and others draw from the Providence of God, for the curableness of all Diseases are not very cogent, and somewhat irreverent (For God being not obliged any more to continue Life or Health to sinful Man than to Beasts that never offended Him, we ought humbly to thank Him, if He hath, among his Creatures, dispersed Remedies for every Disease, but have no right to accuse Him if He have not) so on the other side, I am not much convinced by the grand Argument alledged against *Paracelsus*; and the Chymists, that hold all Diseases to be in their own Nature curable; namely, That they themselves, many of them (no nor even their very Master) lived not to the Age attained by many Strangers to Chymistry.

The Argument that Paracelsus out-lived not the 47th. year of his Age answered.

For this, That many of them (not destroyed by War, or outward accidents) dyed young enough, and consequently by Sickness; and that *Paracelsus* himself out-lived not the 47th Year of his Age, is a much stronger Objection against the Men, than against their Opinion; for it infers indeed plausibly, that they had not such Remedies as they boasted of (since probably, had they had any such, they would have cured themselves with them) but concludes not that no such Remedies can be prepared by any other. And this you will be the less apt to think irrational, if you consider how much more learned, sober and experienced it is possible for many a man to be, than *Paracelsus* appears to have been: For he seems not by his Writings to have been any great Logician
or

or Reasoner; he manifestly despised many parts of Learning, useful to a Physician; he lived not many Years, and spent divers of those few which he lived, in an unsettled and disadvantageous course of life; and yet this *Paracelsus* attained to some such Remedies, as both in his own, and after times, have made him a very considerable Person, in spite of all his indiscretions and deficiencies. And among his other Remedies, his famous *Laudanum* did such wonders, that *Oporinus* himself, in that short account, which seems to be rather a Satyr than a Narrative of his Life, hath this Passage of it: *De Laudano* (saith he) *sub (ita vocabat pilulas instar murium stercoris, quas impari semper numero, in extrema tantum morborum difficultate tanquam sacram medicinam exhibebat) ita gloriebatur, ut non dubitaret affirmare ejus solius usu se è mortuis vivos reddere posse, idque aliquoties dum apud ipsum fui, re ipsa declaravit.* So signal a Testimony coming from one whom the *Paracelsians* call his fugitive Servant, hired by his Enemies to slander him, under pretence of writing his Life, deserves not to be slighted: and though it manifestly contains an *Hyperbole*, yet I doe the lesse wonder at the *Hyperbole*, by reason of those strange things which your Mother, and divers other of your Friends, can tell you, they have seen performed in *England* by *Helmont's Laudanum opiatum* (though much inferiour to that of *Paracelsus*.) And I remember, that a Friend of yours and mine, that is a great enemy to all kinds of Chymical Remedies, and was before also to Chymistry, having begg'd of me a little Bottle of it, which I had obtain'd from a Friend of the younger *Helmont's*, to whom he communicated the Preparation, gave me a while after, an account of such Cures that had been performed, with that small quantity, upon almost dying Persons, as I think it not discreet for me, that was not

The efficacy
of *Paracelsus*
his *Laudanum*.

an Eye-witneſſe of them, to relate. And I remember too, that the ſame Friend of young *Helmont's*, being, at the perſwaſion of one Woman whom he had cured of a dangerous Conſumption, call'd to another that was thought to be dying of an *Aſhma*, came to adviſe with me whether he ſhould meddle with ſo deſperate a Patient; telling me, That ſhe had been many Years ſick of that ſtubborn Diſeaſe, which, in proceſſe of time, paſſing into a *Orthopnea*, had at laſt put her, by want of ſleep (from which the violence of her ſickneſſe had very long kept her) into a Fever, and ſo deſperate a condition, that it was ſcarce expected ſhe ſhould live till the next morning. But I, repreſenting to him that her condition being avowedly deſperate, he might exerciſe his Charity without danger to his Reputation; and perſuading him to try *Helmont's Laudanum*, together with the Spirit of Mans Blood (which we elſewhere teach you to prepare) he gave her that Night a Doſe of thoſe Remedies, which made her both ſleep and breath pretty freely; and a Week after, he coming to viſit me, told me, he had caſually met his Patient well and abroad in the Streets. But theſe are trifles to the Cures which *Helmont* relates to have been performed by our *Irish Butler*, for he tells us, That this Man, by ſlightly plunging a little Stone, he had, into Almond Milk or Oyl, imbued thoſe Liquors with ſuch a ſanative efficacy, that a Spoon-full of the former cured (and that without acquainting him with what was given him) a *Franſciſcan Frier* (a very famous Preacher) of a very dangerous *Eryſipelas* in the Arme, in one hour; and one drop of the latter being apply'd in his preſence, to the Head of an old Laundreſſe, that had been ſixteen Years troubled with an intolerable *Hemicrania*, the Woman was preſently cured, and remained ſo, to his knowledge, for divers Years. He addes almoſt as ſtrange a Cure done in one Night,

Butler's great Remedies.

Helmont in the Treatiſe which he entitles Butler.

Night, upon a Maid of his Wife's, by anointing the part affected with four drops of that Oyl: He further tell us, That the Master of the Glasle-houle at *Antwerp*, being troubled and made unweildy with too much fat, begged some relief of *Butler*; who, having given him a little fragment of his little Stone, with order to lick it nimbly with the tip of his Tongue once every Morning, I saw (saith *Helmont*) within 3 weeks, the compass of his waste lessned by a span, without any prejudice to his health. And to these, *Pyr.* he addes some other Narratives, which, though I confesse I know not well how to believe, yet there are Circumstances which keep me from daring to reject them: For first, as he well observes, that which was most stupendous in this Remedy, was but the smalnesse of the quantity.. Next, a Gentleman in *France*, being not long since reported to have a fragment of this Stone, and to have cured several Persons (and especially one very dignified) of inveterate Diseases, by letting them lick it; my Noble Friend Sir *Kenelm Digby*, then in *France*, was solemnly requested from hence to inquire into the truth of that Report, and answered, That he could not, upon examination, finde it other then true. Besides, *Helmont* not only relates these Cures as an Eye-witness of them, but tells us, how upon an occasion that he mentions, he once suspected the efficacy of the Oyl, and that, without expecting that it should do any thing, he anointed it on the right arm and the ancles of his own Wife, who had for some Moneths been tormented with great pains in the former, and very great tumors in the latter of those parts; and that almost in a trice, motion was restored to her Arm, and all the *adema* of her Legs and Feet vanished; adding, That at the time of his writing she liv'd healthfully, and had done so since that recovery, during nineteen years: And this Story, she, long after her Husbands death,

death, confirm'd to our ingenious Friend Dr. C. who is acquainted with her, and much extolls her: These Circumstances, may be assisted by two more very considerable ones; the one is, That *Helmont* is the more to be credited in these Relations, because mentioning Cures not perform'd by himself, but by another, and that by Remedies unknown to him, he seems by these Narrations, out of loyalty to truth, to eclipse his own Reputation: And the other is, that in a memorable Story which we may elsewhere relate to you (it being not here proper to insert so long a one) you'll finde an eminent and strange testimony given to *Builer's* Secrets, by our famous Country man, Dr. *Higgins*, whose confession you will not doubt, if you consider how rare a Physician and Chymist he was, how familiarly he lived in the same House with *Builer*; and how studiously, at last, they endeavoured to take away each others Life.

But whatever be to be thought, *Pyr.* of *Helmont's* Relation, we may well enough make this reflection on the other things that have been delivered concerning formidable Diseases, that since the power of Nature and Skill may reach much farther then many distrustfull (not to say lazy) men have imagin'd, it will not be charitable to rely too much upon the Prognosticks, even of famous Writers, when they tell us, That such and such Diseases, or Patients in such and such conditions cannot possibly be cured. But rather to follow the sober counsel of *Celsus*: *Oportet* (saith he) *ubi aliquid non respondet, non tanti putare Authorem quanti agrum, & experiri aliud atque aliud.* And this great Physicians authority I therefore make the most use of in the ensuing Essayes, because he is accounted very judicious by the Lord *Vernham*, and other Writers that are unquestionably so themselves.

De Medicina,
lib. 3. cap. 10.

ESSAY



ESSAY IV.

*Presenting some things relating to the
Hygieinal Part of Physick.*

THAT the Dietericall part of Physick, *Pyrophilus*, may, as well as the others, be improved by Naturall Philosophy, were not uneasie to manifest, if my haste would permit it: For 'tis known, that Drinks make a very considerable part (sometimes, perchance, amounting almost to the one half of our Aliments) and most Drinks, as Wine, Beer, Ale, Mead, &c. consist of fermented Liquors: Now as on the one side the ignorance of the Doctrine of Fermentation, and of the wholesome way of both preserving Liquors and making them pleasant, doth questionlesse occasion more then a few Diseases, which in divers places may be observed evidently to proceed from the unwholsome quality of either ill made, or sophisticated Drinks; so on the other side, the distinct knowledge of the true nature and particular *Phænomena* of Fermentation, would enable Men to prepare a great variety of Drinks, not only as harmlesse, but as beneficial as pleasant.

How much preparation may do to correct and meliorate both hard and liquid Aliments, is notably instanced by the account that we receive from both the French and English that inhabit the *Barbados*, *St. Christophers*, and other *Caraibes*

That the knowledge of Fermentation is useful to make our drinks wholesome for Aliments.

How much
simples may be
altered by Pre-
paration, exem-
plified by the
Indians making
Cassavy out of
the poisonous
Plant *Mandio-
ca*.

Odde, unhand-
some wayes of
their making
drink from the
same Root.

History of the
Barbado's pag.
29, 30, 31, 32.

Islands, who solemnly inform us (what is attested also by *Piso*, and other Learned Travellers that write of it) that the Plant *Mandioca* (whose prepar'd Root makes *Cassavy*, and which we have also seen flourishing here in *Europe*) to which the *Indians* are so much beholden, is a rank Poyson. And though I shall not too resolutely affirm it to be a Poyson properly so called; yet in confirmation of its being very noxious, I shall tell you, That having purposely enquired of a very intelligent Gentleman, who commanded an Army of *Europeans* in *America*, what experience he had seen of the qualities of this Plant, he told me, That between thirty and forty of his Souldiers, having on a time (whilst they were unacquainted with the Country) either through ignorance or curiosity, eaten of it unprepared, it cost most of them their Lives. And yet this pernicious Root; which some Herbarists call *Yucca*, by the rude *Indians* ordering, comes to afford them both almost all their Bread, and no small part of their Drink: For this Root being grated, and carefully freed from its moisture, by being included in Bags, and very strongly pressed till all the Juice be squeezed out; it is afterwards dried in the Sun, and so made into the Meal of which they make their Bread: And this very Root, though (as we said) it be poisonous, they cause their old, and almost toothlesse Women, for the better breaking and macerating it, to chew and spit out into Water. This Juice will, in a few hours, work and purge it self of the poysonous quality, affording them a Drink which they esteem very wholesome, and at the *Barbado's* call *Perino*, and account it to be the likest in taste to our English Beer, of any of those many Drinks that are used in that Island.

This nasty way of preparing Drink, *Pyrophilus*, may seem strange to you, as it did to me when I first heard of it; but

but besides the consenting relations both of French and English concerning it, it may be confirmed by the strange assertion of *Gulielmus Piso*, in his new and curious *Medicina Brasiliensis*, where, having spoken of several of the *Brasilian* Wines, he tells us, That they make Liquors of several Plants, besides the Root of *Mandioca*, after the same nasty manner. *Idem* fit (saith he) *ex Mandioca, Patata, Milio, Turcico, Oryza & aliis, quæ à vetulis masticantur, masticataque multa cum saliva expuuntur; hic liquor mox vasis reconditur donec ferveat, facisque ejiciat.*

Voyage de Muscovie & de Perse, p. m. 23.

In *Muscovia* it felt, notwithstanding the unskilfulness of that rude People, *Olearius* informs us, That the Embassadors, to whom he was Secretary, were presented at one time with two and twenty severall sorts of Drink. And at a Country House here in *England* (where I was, by a very Ingenious Gentleman that is Master of it, presented with divers rare Drinks of his own making) I was assured that he had lately, at one time in his House, at least the former mentioned number of various Drinks, and might easily have had a greater, if he had pleased.

Of making drink from sorts of courtie bread.

And on this occasion, I am not willing to pretermitt what is practised in some of our *American* Plantations, as I am informed by the Practisers themselves, where, finding it very difficult to make good Mault of Maiz, or Indian Corn (by reason of hinderances not to be discoursed of in few words) they brew very good Drink of it, by first bringing the Grain to Bread; in which operation, the Grain being both reduced into small parts, and already somewhat fermented, is disposed to communicate easily its dissoluble and Spirituous parts to the Water it is boyled in: To which I shall adde, That I have to think, that the Art of Malting may be much improved by new and skilfully contriv'd Furnaces, and a rational management of the Grain.

Nor

Nor are we alone defective in the knowledge of fermenting Drinks, but even in that of the Materials of which Drinks may be prepar'd.

The Drinks
in use in China.

In that vast Region of *China*, which is enriched with so fertile a Soil, and comprizeth such variety of Geographical parallels, they make not (as *Semedo* informs us) their Wine of Grapes, but of Barley; and in the Northern parts of Rice, where they make it also of Apples: but in the Southern parts, of Rice only: yet not of ordinary Rice, but of a certain kinde peculiar to them, which serves only to make this Liquor, being used in divers manners. And of the Wine there drank, even by the vulgar, our Author gives us this character: The Wine used by the common People, although it will make them drunk, is not very strong or lasting; 'tis made at all times of the Year, but the best only in the Winter: It hath a colour very pleasing to the sight, nor is the smell lesse pleasing to the sent, or the savor thereof to the taste; take altogether, it is a vehement occasion that there never wants Drunkards, &c. And of the Inhabitants of the Kingdome of *Japan*, I remember also, *Pyrophilus*; that *Linschoten*, in his description of those Islands, tells us, That they drink Wine of Rice, wherewith they drink themselves drunk.

History of
China, part. 1.
cap. 1.

Linschoten's
Voyages, Book
1. Chap. 26.

Of Cherry
Wine.

We have here in *England*, at the House of our experienced Mint-master, Dr. *Gordon*, tasted a Wine, which he made of that sort of Cherrys which are commonly call'd *Morellos* that was, when we drank of it, about a year and a half old, but it was somewhat sower, and needed Sugar; And therefore I shall rather take notice to you of my having since drunk Wine made of the Juice of good, but not of extraordinary Kentish Cherries, which, with the help of a *Tantillum* of Sugar added in the Fermentation, kept so well, that though
it

it were above a Year old when I tasted it, I found it a strong and pleasant Wine, not inferiour to many Wines that are brought us from forein parts. But this is nothing to what is averred upon his own experience, by a Learned Divine (to whom you, *Pyrophilus*, and I, am related) who affirms himself to have made out of some sort of wilde Apples and Pears, by bare Fermentation, such Liquors, as though at first somewhat harsh, will not onely keep divers years; but at the end of two or three, attain such strength, and so pleasingly pungent a taste, that they may compare even with choice out-landish Wines, and excell those that are not of the very best sorts of them.

Of excellent
Ciders.

But till we have in another Essay an opportunity of presenting you something out of the Observations of *Olearius*, the newly mentioned Divine, and our own, concerning Fermented Liquors, we shall content our selves to manifest our want of curiosity about the materials of which Drinks may be prepared, by this, That the Drinks of one whole Country are oftentimes unknown to the Inhabitants of another: That the Wine made of Rice, which we lately mentioned to be of frequent use in the Kingdoms of *China* and *Japan*, is of little or none in *Europe*, I need not prove to you. I have been in divers places where Beer and Ale, which are here the common Drinks, are greater rarities than the medicated Liquors sold only in Apothecaries Shops. In divers parts of *Muscovie*, and some other Northern Regions, the common Drink is *Hydromel*, made of Water fermented with Honey; And indeed, if a due proportion betwixt those two be observed, and the Fermentation be skilfully ordered, there may be that way, as experience hath assured us, prepared such a Liquor, both for clearness, strength, and wholesomeness, as few that have not tasted such a one, would readily believe.

Of Hydromel.

m

The

Of Sugar
Wines,

Lib. 4. cap. 1.

The French and English Inhabitants of the Canibal Islands, make, by Fermentation, a Wine of the dregs collected in the boiling of Sugar. A like to which. *Piso* tells us, That they make in *Brasil*, and commonly call *Garapà*, which though made by the mixture of Water, the Inhabitants are very greedy of; and when it is old, find it strong enough to make them Drunk. And how also in these colder Countrys a good Wine may be made of only Sugar and Water, we may elsewhere have occasion to teach you.

Lib. 4. cap. 6.

Of other Bra-
silian and Bar-
bada Wines.

And in *Brasil* they likewise, as the same Author informs us, make a Wine (unknown to most other Regions of the World, of the Fruit of *Acaju*, which yet, upon his experience, he much commends, telling us, That it is strong enough to inebriate, and may, he doubts not, be kept good many Years; and that though it be astringent, yet both in himself and others he found it diuretical.

In the *Barbada's* they have many Drinks unknown to us; such as are *Perino*, the Plantine-drink, *Grippo*, *Punch*, and the rare Wine of Pines, by some commended more than the Poets do their *Vectar*; some of which we therefore make not, because the Vegetables whereof they are produced, grow not in these colder Climates: But others also they have, which we have not, though they are made of Plants to be met with in our Soil; as for instance, the drink they call *Mobbie*, made of *Potato's* fermented with Water, which, being fit to drink in a very few days, and easie to make as strong almost as the maker pleaseth, would be of excellent use, if it were but as wholesome as it is accounted pleasant.

In the *Turkish* Dominions, where Wine, properly so called, is forbidden by *Mahomet's* Law, the Jews and Christians keep in their Taverns, a Vinous Liquor made of fermented

ed Raisons, after a manner, which (when we shall elsewhere acquaint you with it) you will easily discern to be capable of much improvement from the knowledge of Fermentation. And indeed by the bare fermenting of Raisons and Water in a due proportion, without the helpe of Barme, Leaven, Tartar, or other additament to set them a working, we have divers times, in a few dayes, prepared a good Vinous Liquor, which having for tryals sake distilled, it afforded us greater store than we expected, of inflammable Spirit, like that of other Wine.

The way to
make Wine of
Raisons.

But I have sometimes wondred that Men had no more curiosity to try what Drinkes may be made of the Juices obtainable, by wounding or cutting off the parts of severall Trees, and some other Vegetables: For that in the *East Indies*, their *Sura* is made of the Liquor dropping from their wounded *Coco* Trees, we have not long since out of *Linscoten* informed you. And sober Eye witnesses have assured us, That in those Countries they have but too often seen the Seamen drunk, by the use of Liquors weeping out of the Incisions of wounded Vegetables; and afterwards fermented.

Of Wines from
the dropping or
weeping of
wounded Ve-
getables.

And that even in *Europe*, the Alimentall Liquor, drawne by Trees from the Earth, may receive great alterations from them before it be quite assimilated by them, may be gathered from the practice of the *Calabrians* and *Apulians*; who, betwixt *March* and *November*, do by Incisions obtaine from the common Ash tree, and the *Ornus* (which many Botanists would have to be but a wild Ash) a sweet Juice, so like to the Manna, adhering in that Season to the Leaves of those kind of Trees, that the Native call it in their Language, *Manna del corpo*, or *Trunk-manna*; and lest we should think they draw all this sweetness from the Soil of that particular part of *Italy* where they grow, you may be satisfied by the

Learned *Chrysostomus Magnenus*, in his Treatise *De Manna*, that it is to be met with in several other places. And he addes, That in the Dukedom of *Milane*, where he professeth Physick, there is no other Manna used than that which is (as he speaks) *Vel è trunco expressum* (which he somewhere calls *Manna Truncinum*) *aut in ramis stiriatim concretum*; and that yet it is safely and prosperously used.

De Manna
cap. 18.

Of the tears of
the Wal-nut-
trees:

I had communicated to me, as a rarity, a secret of the King of *Polands*, which is said to do wonders in many Diseases, and consists only in the use of the Liquor which drops about the beginning of the Spring, from the bar'd and wounded Roots of the Walnut-tree: but because I have not yet made tryal of it my self, I shall pass on to observe to you, that in some Northern Countries, and even in some parts of *England* bordering upon *Scotland*, the almost insipid Liquor that weeps in *March*, or the beginning of *April*, out of the transversly wounded Branches (not Trunks) of the Birch-tree, is wont to be used by Persons of Quality as a preservative from the Stone; against which cruel Disease, *Helmont* highly extols a Drink made of this Liquor and *semen dauci* and *Beccabunga*; and I think not without cause. For not to mention all the commendations that have been given me of it by some that use it, I have seen such strange relief, frequently given among others, to a Kins-man of mine, to whom hardly any other Remedy (though he tryed a scarce imaginable variety) was able to give ease (and in whose dissected Bladder, after another Disease and killed him, a Stone of many Ounces was found) that I usually every Spring take care to provide a quantity of this Water, with which alone, without the other Ingredients mentioned by *Helmont*, my Kins-man used to be relieved as long as he could keep it, which you may do the longer, by pouring upon the top of
it

The Use of the
tears of Birch
(with some o-
ther Ingredi-
ents) for the
Stone.

it a quantity of Sallet Oyl, to defend it from the Air; and perhaps also by Distillation: By which (last named) way, I know an Ingenious Man that is wont to preserve it for his own use, and sayes, he findes it not thereby impaired in vertue. But the most effectual way that ever I yet practised, *Pyrophilus*, to preserve both this and other Liquors and Juices, is dexterously and *sufficiently* to impregnate them with Fume of *Sulphur*, which must be at divers and *often* times as it were, incorporated with the Liquor by the due agitation; the manual Operation belonging to this Experiment, I may hereafter have occasion to describe more fully, together with the particular Effects of it in several Bodies. And therefore it may here suffice to tell you, that if you practise it carefully, you will, perhaps, think your self obliged to thank me for the discovery of it, though a heedful Reader may finde it, not obscurely, hinted in *Helmont's* Writings.

The wayes to
preserve these
Liquors.

I might here annex the great commendation which I have found given to this Birch-water, by eminent Writers, against the hot distempers of the Liver, and divers other affections; and especially how *Freitagius* commends it very much to dilute Wine with: and addes, *Hæc est dulcicida & grati saporis, sitim sedat viscerum & sanguinis fervorem temperat, obstructions referat, calculum pellit.*

The Use of
these tears of
Birch in hot
distempers of
the Liver and
hot Catarrhs.
In consilio Medicinatis in Catarrho calido pro Principe quodā,

But I suppose you will think it high time for me to proceed to another subject; and indeed I should not have spent so much time in discoursing of Drinks, but that I am apt to think, that if there were greater variety of them made, and if they were more skilfully ordered, they might, by refreshing the Spirits, and insensibly altering the mass of Blood, prevent and cure (without weakning or much troubling the Patient) almost as many Diseases as the use of our common, unwholsome and sophisticated Wines is wont to produce.

For in Fermentation, the Sulphurous (as Chymists call them) the Active, and the Spirituous parts of the Vegetables, are much better loosened, and more intirely separated from the grosser and clogging parts, in most Mixts, than they are by the vulgar ways of Distillation, wherein the Concrete is not opened by previous Fermentation. And these nobler parts being incorporated with our Aliments, are with them received freely, and without resistance carryed into the Mass of the Blood, and therewith, by circulation, conveyed to the whole Body where their Operation is requisite. And I remember, that discoursing one day with an eminently learned and experienced Physician, of the Antinephritical virtue of our common wilde Carret-seed, fermented in small Ale; he smilingly told me, that he found its efficacy but too great; For having prescrib'd it to some of his rich Patients, who were wont frequently to have recourse to him in their Nephritical distempers, after the use of this drink for a pretty while, he seldome heard of them any more. And for your encouragement, *Pyrophilus*, to make tryals of this nature, we will adde, That though the Seed it self be not over well tasted, yet being fermented in a due proportion with the Liquor (we used an Ounce and halt of the Seed, to a Gallon of the Ale) the Drink composed of both tasted pleasantly, almost like Lemmon-beer.

The Use of
Draught Ale,
and proportion
of the seed to
the liquor.

And that you may the less wonder at the efficacy of fermented Liquors, it is worth considering, what virtue is ascribed to the bare decoction of that Herb, which the *French* and we call *Thé*, or *Té*, which is much magnified here; and as far as my little experience in my self, and others (of which more hereafter) reaches, not altogether without cause: But among the *Chineses* and the *Japonians*, it is the common Drink of Persons of Quality, by whom it so highly praised,
that

Of The or Té.

that the experienced *Tulpinus*, in the new Edition of his Observations, tells us, That one pound of the Japonical *T'chia* (as the Natives call it) is not unfrequently sold for one hundred pounds of Silver; which is not to be wondered at, if they justly ascribe to it, that in those Countries Men are not subject to the Stone, or the Gout, and it but one half of the Virtues he there attributes to it, be for the most part to be found in it.

Obs. Lib. 4.
cap. ultima.

I might, when I told you of the variety of Materials not used among us, have added one strange Drink, which a Chyrurgion, that while since lived at _____ in the *East Indies*, told me, he saw much used thereabouts: They make it of the raw Flesh of Goats, Capons, and the like, which together with Rice and *Molasses* (or black course Sugar) they put into a quantity of Water and distill it in an Alimbick till the Liquor be stronger than Brandy (as they call common weak Spirit of Wine, or of Lees of Vinous Liquors) And this *Rack* (as the extravagant Liquor is called) is often drunk in hot weather, and found very comfortable: those that use it, prizing it much, as supposing it draws a nutritive and cherishing vertue from the Flesh, as indeed, if any quantity of the nobler parts of that, do concur to the constituting of the Liquor, it may probably be, at least to divers Bodies, very wholesome in that Country, where they finde strong Drinks necessary to recruit their Spirits, exhausted by the excessive heat of the Climate. As I remember, the experienced *Bontius* in his *Medicina Indorum*, tells us, That the Merchants travelling through the scorching Deserts of *Arabia*, *Persia*, or *Turkey*, finde it best to quench their thirst by a draught of the Spirit of wine, or else of the strongest *Persian* or *Spanish* Wine.

Of Animal
Drinks.

Dialogo 3.

And of the great use, if not necessity of either Brandy,

The Use of
Brandy Wine
in hot Cli-
mates.

or such other strong and Spirituous Drinks in the hot Climats of the *Indies*, divers intelligent Persons of our own Country, have, upon their own experience, sufficiently satisfied us.

The Use of
Natural Philo-
sophy to meli-
orate Meats.

Nor, *Pyrophilus*, is Natural Philosophy able only to improve our Drinks, but the rest of our Aliments also: For not to mention, that Experience hath assured us, that by skilfully contriv'd Ovens (wherein the heat plays every way about the Bread, without yet suffering any of the smoak or steams of the Fire to come at it, and wherein what degree of heat you please may be continu'd from first to last) better Bread may be bak'd, than in our common Ovens, where the Bread rests upon the Hearth, and the heat is continually decaying. Not to mention this, I say, Physiology can enable us to confer a very grateful taste on very many of the things we eat, barely by a skilful and moderate untying and exciting the formerly clogg'd Spirits, and other sapid parts contained in them. It can teach us to make better Bread than is commonly eaten: And by discovering to us a better Art of Cookery, than *Apitius* and his successors have left us, and by substituting innocently sapid things, instead of those unwholesome ones, their deliciousness endears to Men; It can teach us to gratifie Mens Palates, without offending their healths: and in preserving of fresh Meats, Fruits, &c. beyond their wonted seasons of duration, the Naturalists skill may perform much more then you will readily believe.

And yet to incline you not to be too diffident in this particular, let me inform you, That much hath been already performed, as to the preservation of Aliments, even by those that have not troubled themselves to make Philosophical enquiries after the Causes and Remedies of Putrefaction in Bodies, but only have been taught by obvious and dayly Observations, that the Air doth much contribute to the corruption
of

of some Bodies, and the exclusion of Air to the hindring it. I remember, the inquisitive and Learned Mr. *Borreel*, assured me some while since, That he had in his Country, *Holland*, eaten Bisket that was yet good, after it had been carryed from *Amsterdam* to the *East-Indies*, and brought back thence again (in which Voyage, between two and three Years are wont to be spent.) And to confirm my conjecture of the way of preserving this Bread so long: He told me, that the curious Merchant whose it was, used no other Art, then the stowing his Bisket, well baked, in Casks exactly calked; and besides, carefully lin'd with Tin, for the more perfect exclusion of the Air. Adding, That to the same end the Biskets were so placed, as to leave as little room as possibly might be in the Cask, which also was not opened, but in case of absolute necessity, and then presently and carefully closed again.

Of preserving
Bisket from
putrefaction.

I may elsewhere tell you of an eminent Naturalist, a Friend of yours and mine, that hath a strange way of preserving Fruits, whereby even *Goof-berries* have been kept for many Moneths, without the addition of Sugar, Salt, or other tangible Bodies; but all that I dare yet tell you, is, That he assures me his Secret consists in a new and artificiall way of keeping them from the Air.

Of preserving
fruits.

But it seems more difficult, as well as more usefull, to be able to preserve Meat long without Salt; for 'tis sufficiently known to Navigators, how frequently, in long Voyages, the Scurvy, and other Diseases, are contracted by the want of fresh Meat, and the necessity of feeding constantly upon none but strongly poudred Flesh, or salted Fish; and therefore, he is much to be commended that hath first devised the way to keep Flesh sweet, without the help of those fretting Salts Men are wont to use to make it keep. This way is not un-

a

known

Of preserving
Meats wasted
for long Voy-
ages.

known to some ingenious Persons in *London*: One of the most noted of whom, upon my conjecturing how it may be performed, confessed to me, that I had hit upon the way in general: But the most satisfactory account I could get of it, was from an English man, that lately practised Physick in the *East-Indies*, who, finding I was no stranger to what I asked him about, told me freely, that he had seen both Goats-flesh, and Hens, so well preserved by this way, that though it were put up in the *East-Indies* a while before he came thence, yet he eat of it, and found it good and wholesome, between the Islands of *Cape Verd* (as the Sea-men call them) and *England*; so that this Meat continued sweet above six Moneths, notwithstanding the heat and closeness of the Ship, the excessive heat they met with in their Passage under the Line, and consequently through the Torrid Zone: and that the way was only this, That the Meat being well roasted, and cut in pieces, was carefully and conveniently ranged in a very close Caske, into which, afterwards, there was poured as much Butter melted, skimmed, and decanted from the grosser and ranker Parts, as would fill up all the intervals left between the several pieces of Flesh, and swim about them all, and thereby keep out the Air from approaching them; and then the Cask, being exactly closed, was stowed up in a convenient place in the Ship, and kept unopened till the Meat was to be eaten. And it must not be omitted, that the Relator, and others that had the care of making Provision for the Voyage, were fain, instead of Butter made of Cows Milk (which could not be had where they took in their Lading) to make use of that made of Goats, or Ews Milk, which is not (as the *Indians* make it) so good, and to whose rankness he ascribed that which he had observed in some of the Meat buried in it; which he thought might have been preserved longer,
and

and *better tasted* (for *wholsome* and *incorrupt* he said it was) in our *European* Butter, whose power to preserve Meat bury'd in it, after due Coction, hath been confirmed to me upon their own observation, by an experienc'd Officer of the English Fleet, that had the over-sight of the Provisions, and by others that had opportunity to observe it.

But how much the Naturalists skill may advance the Dietetical part of Physick, by enabling Men to make Aliments much lastinger then naturally they are, I must not here labour to convince you by other instances, that I may not anticipate what we have elsewhere to acquaint you with, from other Mens Experiments, and our own, about the conservation of Bodies. Only I shall at present tell you in general, That I hope there will be wayes found out to preserve even raw Flesh it self (for of the keeping of roasted, we have just now given you an instance) with things that do not so much fret it, nor give it so corrosive a quality, when eaten, as our common Salt doth. For not to mention what several curious Persons have practis'd, of salting Neats Tongues with Salt-peter, which though done only to make them look red, shews that a Body, not corrosive like common Salt, may preserve Flesh: I have, for tryal sake, kept an entire Puppy of a pretty bignesse, untainted for many Weeks (and that in the midst of Summer) and that without slaying, drying (by Fire or otherwise) or so much as exenterating him, or cleansing him, or doing any thing towards the preserving of him, save the keeping him immersed in a well stoppt Vessel, under Spirit of Wine (from whose taste, I presume, Meat may be easily freed by Water) and there seem'd small cause to doubt, that the only thing that hindred me from keeping him much longer, was the want of time to pursue the Experiment, and take notice of its success: For I remember, I have the same

Of preserving
raw meats.

Salting Neats
Tongues with
Salt-peter.

Of preserving
Flesh in Spirit
of Wine.

way kept a soft Substance, taken raw from an Ox or Cow, for many Moneths (if I mistake not, eighteen or twenty) and found no putrefaction or ill sent in the immerfed substance, which, for ought I know, might have been preserved divers Years together the same way, or at least, by an easie improvement of this method, of which, as I lately intimated, I intend you hereafter an account.

Of conserving
by Sugar and
making Sugar
of other con-
cretes besides
the Cane,

And I shall further adde on this occasion, That if we reflect upon *Sugar*, which is (at least in these Western Regions) but an almost recent discovery, and consider how many Bodies are with it, by Confectioners and others, not only preserved, but rendred exceeding gratefull to the taste; that single instance may suffice to make us think it probable, that expedients yet unthought of, may, by an insight into Nature, be found out, for the preservation of Bodies; especially, if our ingenious Friend, Mr. W. would shew us, how out of divers other Concretes, besides the Sugar Cane, a Substance not unlike Sugar (though of different taste, according to the nature of the Vegetable, that affords it) may, by a peculiar industry, be prepared: which, that you may not

* *Linchoten's Voyages*, chap. 66. —

When they desire to have no *Cocus*, or Fruit thereof (namely of the Palm-trees) they cut the Blossoms of the *Cocus* away, and binde a round Pot, with a narrow mouth (by them called *Calao*) fast to the Tree, and then stop the same close, round about with Pot-earth, so that neither Wind nor Air can enter in, or coore forth; and in that sort, the Pot, in that space, is full of Water, which they call *Sura*: and is very pleasant Drink, like sweet Whey, and somewhat better.

think unfeazable, let me mention to you (for perhaps he hath not yet taken notice of it) what even *Indians* have done of this nature. And first, let me inform you of what wee are told by *Linchoten* * concerning that Drink, which in the *East-Indies* they call *Sura*, and made of the Liquor dropping from the Blossoms, that they cut away from the *Indian Palm-Tree* which bears the *Coco Nut*. For of this *Sura*, he tells us, That amongst other things, they make Sugar (which is called *fagra*) which is made

made by boiling that Liquor, and setting it in the Sun, where it congeals to Sugar.

And though I must not conceal from you, that our Author adds, that it is not much esteemed by reason of its brown colour, and for that (to use his words) they have so great quantity, and abundance of white Sugar throughout all *India*, yet the latter reason, of the cheapness of *Jagra*, seems to be the principal. For probably, if other Sugar were scarce, the melioration of this would be attempted; and 'tis very likely, That if a skilful Naturalist had the ordering of that sweet Juice, of which the *Indians* make their *Jagra*, he might very well make of it a Sugar of no small use; and such a Sugar would be very convenient in many cases, and to many Persons, for its being different from the common Sugar, though it should not be better. *Garcilassus* also (a much applauded Writer concerning the *West-Indies*) treating of the Fruits of a *Peruvian* Tree, called by some *Molle*, and by others *Mulli*, *Conficiunt* (saith he) *ex eo potum confricando blande inter manus in aquâ calidâ donec dulcor omnis defricetur: Percolant hanc aquam servantque dies tres quatuorve donec subsideat; potus est limpidissimus, &c. Aqua eadem cocta convertitur in optimum mel:* And of the same Plant, *Petrus de Cieca* hath this confirming Passage, *Ex huius fructu cum aquâ decocto, pro coctura modo. fit aut vinum sive potio admodum bona, aut acetum aut mel.* And that there is a great affinity betwixt such Vegetable Honey's and Sugar, especially if the Juices be ordered with a design of turning them rather into Sugar than Honey, you may easily gather from the next and more memorable instance which we are to mention, and which is afforded us by the diligent Describer of the *Brazilian* Plants, who treating of the *Caraguata*, or *Erva Babosa* (or as some would have it, *Herba innotata canle portulaca*) hath these

Apud Joh. de Lañ. descr. India, l. 10. c. 3.

Apud eundem eodem loco.

words to our present purpose: *Porro* (saith he) *radendo novacula petrosa stolones, emanat, ex concavitate liquor quidam tantâ copiâ ut ex unâ solummodo plantâ (Mirabile dictu) interdum 50. aut plures arœa effluant, è quo liquore fit vinum, acetum, mel & saccharum: liquor quippe per dulcis coquendo redditur multo suavior and spissior, ita ut tandem in saccharum congelascat.*

Since the writing of these last Lines, being visited by an ancient *Virtuoso*, Governour to a considerable Colony in the Northern *America*, and inquiring of him, among other particularities touching his Country, something in relation to the thoughts I had about the making of severall kinds of Sugar, he assured me, upon his own experience, that there is in some parts of *New England*, a kind of Tree, so like our Walnut trees, that it is there so called, whose Juice that weeps out of its Incision, &c. if it be permitted slowly to exhale away the superfluous moisture, doth congeal into a sweet and saccharine substance; and the like was confirmed to me, upon his own knowledge, by the Agent of the great and populous Colony of the *Masachusets*. And very lately demanding of a very eminent and skilfull Planter, why, living in a part of *America*, too cold to bear Sugar-Canes, he did not try to make Sugar of that very sweet Liquor, which the Stalks of *Maize*, by many called *Indian-Wheat*, affords, when their Juice is expressed, he promised me he would make tryal of it: Adding, That he should do it very hopefully, because that though he had never been solicitous to bring this Juice into a saccharine form, yet having several times, for tryal sake, boild it up to Syrup, and employed it to sweeten Tarts, and other things, the Guests could not perceive that they were otherwise sweetned than with Sugar. And he
further

further added, That both he and others, had, in *New-England*, made such a Syrup with the Juice of Water-Melons.

Nor, *Pyrophilus*, is it only by teaching Men to improve the wholesomnesse and tastes of the Aliments, or to keep them long uncorrupted, that the Naturalist may contribute to the preservation of Mans health; For from the ingenious attempts of *Sanctorius*, in his *Medicina Statica*, we may be invited to hope, that there may be wayes, as yet unthought of, to investigate the wholesomnesse or insalubrity of Aliments; as he, by the weight of Bodies, after having fed on such and such Mears, finds that Swines Flesh, Melons, and some other things that he names (in the third Section) do much hinder insensible Perspiration, and consequently are unwholsome; though, as I take it, it were not amiss, that before such Observations be framed into general and established Aphorismes, they were carefully made in Bodies of differing Ages, Sexes and Complexions, and with variety of Circumstances: But then again, presuming these Maximes to be judiciously framed, the same *Statica Medicina* makes it hopefull, that there may be unthought of Methods found, whereby, by wayes different from those formerly used by Physicians, a Man may be much assisted in the whole manner of ordering himself, so as to preserve health, and to foresee and prevent the approach of many Distempers. And perhaps by such unthought of wayes, divers Paradoxes of concernment to Mans health may be made out, as the diligent *Sanctorius* to that Observation proposed in these words, *Semel aut bis in mense facto excessu in cibo & potu, die sequenti, licet sensibiliter non evacuet, minus solito perpendit annexus* (in the following Aphorisme) addeth this important Corollary: *Vitæ uniformis caret beneficio illorum qui semel vel bis in mense excedunt*

That the naturalist may finde out new wayes to investigate the wholesomnesse or insalubrity of Aliments proved by Instances out of *Sanctorius* his *Medicina Statica*.

See. 3.
Aphorism. 96.

The difference in transpiration betwixt the times after ordinary diet and after excess tried by the weighing of mans body.

Difference in the weight of waters.

cedunt: expultrix enim à copia irritata excitat tantum perspiratus, quantum sine statica nemo crederet. And indeed, experience hath informed us, that the promoting or suppressing of insensible transpiration, by which, in a day, the Body may discharge it self of four or five pound of excrementitious Matter, hath a much greater power to advantage or prejudice health, then is wont to be taken notice of; so that we see that the Staticks, which, though long known, were thought uselesse to Physick, may afford severall important directions in reference to the preservation of Mans health, to which there are likewise other wayes whereby the Naturalist may contribute. For he may also devise means, whereby to judge of the qualities of Aliments, especially Drinks in their respective kinds; and likewise of the temperature of the Air in this or that place assigned, we shall, in one of the following Essays, describe to you a small slight Instrument, by the help of which, one that is acquainted with this or that particular sort of Wine, may give a near guess whether it be embased with Water or not. And whereas in most hot Countries, where Water being the common Drink, 'tis of great concernment to mans health to be able to make a good estimate of the salubrity of it; And whereas Physicians are wont to think Water *cæteris paribus*, the better and purer the lighter it is, this Instrument presently manifests, without any trouble of weighing in Scales, what among any Waters proposed is the heaviest, and which the lightest, and what difference there is of gravity betwixt them: And this disparity may sometimes be so great, that I remember some of our English Navigators tell us, That upon bringing home a sort of Water out of *Africa* into *England*, they found, by the common way of ponderation, the *African* Water in the same bulk, to be about four Ounces in the pound lighter then the

the *Englsh.* And as the thicknesse, or leightnesse of Waters may be thus presently discerned by this *Hydrostaticall* way, so 'tis possible, by some Chymicall Experiments, easily enough to discover some other qualities, wherein Waters, that are thought to be of the same nature, differ from each other; as we finde that very many Pump-waters will not beare Soap, as Rain-waters, and the generality of Spring-waters will do: some water will not well dye Scarlet, or some other particular colour, because they are secretly imbued with some kinde of saline Substance, that hath an operation it should not have upon the Ingredients employed by the Dyer. And I have sometimes discovered a latent Sea-salt in Water, where others suspected no such matter, by pouring into it a solution of good Silver, made in *Aqua fortis*: For as common Salt, as well as the spirit of it, will precipitate the Metall out of such a solution, in the forme of white Calx; so it seemed rationall to conceive, that in case the Water I suspected had been imbued in its passage through the Earth with a saline quality, though not conspicuous enough to be taken notice of by the taste; these saline Corpuscles diffused through the Water, would, though faintly, act their parts upon the dissolved Silver; and accordingly I found, that upon the mixtures of such Waters; and the Metalline solution, there would immediately be produced a kinde of whitenesse (from some parts of the Metall precipitated by the Salt:) to avoid which, I have often been faine to use, in places where I met with such Waters; either Rain-water, or that which is freed from its common Salt, by a slow Distillation.

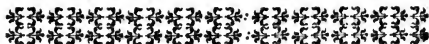
And as for the temperature of the Aire, which is acknowledged to be of exceeding great consequence, both as to health; and as to the prolongation of life; and which is possibly yet of greater moment to both than most Men imagine,

That Chymicall experiments may discover other qualities in Waters.

That the Naturalist may discover the qualities of particular Airts.

the skilfull Naturalist's sagacity, if it were employed to that purpose, might probably finde divers waies of discovering the qualities, and consequently the salubrity and unhealthfulnesse of the Aire in particular places. For the diligent *Sanctorius* (in the second Section of his *Medicina Statica*) teacheth us how to estimate the healthfulnesse and insalubrity of the Air, by the weight of those Mens Bodies that live in it. And besides this (nice) way, we see, that by the late invention of Weather-Glasses, 'tis easie to discerne which of two Neighbouring Houses, and which of two rooms in the same house is the colder. And I remember, I have sometimes bethought my selfe of a slight way (to be mentioned in one of the following Essayes) by the help of which, it is not hard to determine in which of two places propos'd, the Aire is, *cateris paribus*, the dryer or the moyster; And to give also some guesse, both how much at the same time the Aire of one place exceeds that of the other, and how the temperature of the Aire changeth in the same place at severall times, either of those qualities. And that the differing operations of severall Airts, upon certaine sorts of Flesh hung in them, upon some fading colours, upon Bodies subject to gather rust, or to be tarnish'd, and in a word, upon divers other subjects, may be more considerable than Men seem yet to have taken notice of, I shall thinke it sufficient to have intimated in this place, being desirous to hasten to the following Essay (wherewith I am to conclude, what I have to offer to you concerning Physick) that I may have the more time to employ on it.

ESSAY



ESSAY. V.

*Proposing some Particulars wherein Natural
Philosophy may be usefull to the
Therapeutical part of Physick.*

And now, *Pyrophilus*, the method that we formerly prescribed to our selves (a little after the beginning of the first Essay) requires, that we consider a while the *Therapeutical* part of Physick, which is indeed that, whose improvement would be the most beneficial to Mankind; and therefore I cannot here forbear to wish, That divers Learned Physicians were more concerned, than they seem to be, to advance the Curative part of their Profession; without which, three at least of the four others may prove indeed *delightful* and *beneficial* to the Physician, but will be of very little use to the Patient, whose *relief* is yet the principal end of Physick: whereunto the *Physiological*, *Pathological*, and *Semiotical* parts of that Art ought to be referred. There was a while since, a witty Doctor, who being asked by an Acquaintance of mine (himself an eminent Physician, and who related this unto me) why he would not give such a Patient more *Generous Remedies*, seeing he grew so much worse under the use of those *common Eanguid ones*, to which he had been confin'd, that he could not at the last but dye with them

The Introdu-
tion

in his Mouth ? briskly answered, *Let him dye if he will, so he dye secundum artem.* I hope there are very few of this Man's temper, but it were to be wished, that there were fewer Learned Men that think a Physician hath done enough, when he hath learnedly discoursed of the seat and nature of the disease, foretold the event of it, and methodically employed a company of safe, but languid Remedies, which he had often before found almost as unable to *cure* the Patient, as unlikely to *kill* him. For by such an unprofitable way of proceeding, to which some lazy or opinionited Practizers of Physick (I say *some*, for I mean not *all*) have, under pretence of its being safe, confined themselves, they have rendered their whole Profession to obnoxious to the Cavils of such Empericks, as he that (as the Lord *Verulam* reports) was wont to say, Your *European* Physicians are indeed Learned Men, but they know not the particular Cures of Diseases, and (unreverently enough) to compare our Physicians to Bishops, who had the Keys of *binding and loosing* and nothing else: Which brings into my mind, what Monsieur *De Balfac* relates (in his witty French Discourse of the Court) of a Physician of *Millain*, that he knew at *Padua*, who being content with a Possession of his Science, and (as he said) *The enjoyment of the Truth*, did not only not particularly enquire into the Cure of Diseases, but boasted, That he had killed a Man with the fairest Method in the World: *E morio* (said he) *canonicamente, è con tutti gli ordini.* And such Scoffs and Stories are readily enough entertained by the major part of Men, who send for Physicians, not so much to know what ailes them, as to be eased of it, and had not rather been methodically killed, than Empirically cured. And it doth indeed a little lessen even my esteem of the great *Hippocrates's* skill; to find mentioned in his Writings so many of his Patients,

tients, of whom he concludes, that they dyed: And I had much rather, that the Physician of any Friend of mine, should keep his Patient by powerful Medicines from dying, than tell me punctually when he shall dye, or shew me in the opened Carkass why it may be supposed he lived no longer. But, *Pyrophilus*, my Concern for Mankind, and for the reputation of many excellent Physicians, whose Profession suffers much by the want of either Industry or Charity, in such as we have been speaking of, hath diverted me longer than I thought, from telling you, That I suppose it will not be very difficult to perswade you, that this so useful *Therapeutical* part of Physick is also capable of being much improved by a knowing Naturalist, especially if he be an intelligent and expert Chymist, as in this Essay we will suppose him.

CHAP. I.

SOME *Paracelsian* would, perhaps, set forth, how much more easie to be taken Chymically-prepared Medicines are wont to be, than those loathsome and clogging *Galenical* Potions, *Bolus's*, &c. which are not only odious to the Takers, but (which is much worse) are to many so offensive; that either the Patients cannot get them down, or the incensed Stomach returns them by Vomit, before they have stayed long enough in the Body to do any more than distemper it. But I shall not much insist on this, because I think wholsomeness to be much more considerable in a Remedy than pleasantness: though, I confess, I could wish that Physicians were more careful to keep Patients from being almost as much troubled by Physick, as by the Disease; and to cure according to the old Prescription, not only *cito* and *tuto*, but *jucunde* too:

That the naturalist may invent Medicines Chymically-prepared, more pleasant than the ordinary *Galenical* ones.

Especially considering that, as we were saying, the loathsomeness of some Medicines maketh the Stomach reject them, before they can have performed their Operations. And it is, I presume, on this account as much as on any other, that at *Oxford* Learned and Practical Physicians, of your Acquaintance, make very frequent use (on Patients not Feverish) of the *resin of Jalap*, barely drawn with Spirit of Wine; since, as we have tryed, six, eight or ten, or more Grains, of this almost insipid Resin, being cleanly prepared, according to Art, and with a little *Gum-tragacanth*, and half its weight of powdred Cinamon, or some such thing made up, may be taken in the Morning, in form of Pills, instead of a Potion; and is wont to evacuate plentifully enough, and yet gripe the Patient much less than common Purges. But, as I said, I shall not insist on this. I might better commend the usefulness of Chymistry to the *Therapeutical* part of Physick, from hence, That it is probable, that even emptying Medicines may, by the *Spagyrist's* Art, be so prepared, as not only to be less offensive than common Purges or Vomits in the taking, but to be less painful in the working: As I have often observed, both in my self and others, that upon the taking of the clear, and not loathsome Mineral *Waters of Barnes*, though the Medicine wrought with me ten or twelve times in a Morning, yet it did not either pain me, or make me sick, or disorder me for the remaining part of the day, any thing near so much as a common Pill or Potion that had wrought but once or twice would have done. And I shall elsewhere (God permitting) teach you a preparation of Silver, whereof about three or four Grains being made up (with any proper Conserve) into a little Pill, is wont to make a copious evacuation of *Serum* especially (in Bodies that abound with it) without making the Patient almost at all sick, or griping him: Infomuch that

I

An Instance
in Resin of *Jalap*, Mineral
Waters and the
Authors *Pil.*
Lunares.

I know some Persons, both Physicians and others, with whom though this Medicine worke frequently in a day, and though (which is stranger) once taking of it will with some Persons worke so for two or three, or more dayes successively, yet they scruple not to goe abroad and follow their businesse, and some that take it, tell mee, That when it workes not with them, as for the most part, when it hath freed the Body from superfluous *Serum*, it will cease, and in some Bodies will scarce purge at all, it neither puts them to paine, nor makes them sick.

And now I am speaking of the painlesse wayes of relieving the sick, I shall adde, That there is another way, whereby 'tis to be hoped, many Patients may be rescued from a great deale of paine, and that is by finding out Medicaments, that may in severall Distempers, that are thought to belong peculiarly to the Chyrurgions hand, excuse the need of Burning, Cutting, Trepanning, and other as well painfull as terrible manuell Operations of Chirurgery. *Helmont* tells us, That he knew a Country Fellow, who cured all fresh Wounds by a Drinke made (as I remember) of burnt *Tilia*. I have informed you in another Essay, of the Cure I observed to be made of the exulcerated *Tumors* of one sick of the *Kings Evil*, by the use of Beere, altered by a little Plant, that did not at all disturbe the Taker. If we may believe *Helmont's* and *Paracelsus's* *Præcipitatus Diaphoreticus*, taken at the Mouth, doth cure, to use his owne Words, *Carcinoma, Lupum, & quodlibet Aethiomenum cacoethes ulcus, siue externum siue internum*. And if there be any truth in what hath been affirmed to mee by severall Eye-witnesses, as well Physicians as others, concerning the *Weapon-salve*, and *Powder of Sympathy*, we may well conclude, That Nature may performe divers Cures, for which the help of Chirurgery

That the naturalist may find out inward medicines able to do Chirurgical Cures, proved by divers Instances

Helmont. De Febris, c. 14.
See also the same Author in *Treatat. quem vocat Aquea. Paracels. & Lib. de Febr. Cap. 14.*

gery is wont to be implored, with much lesse paine to the Patient, than the Chirurgion is wont to put him to. I know a very ingenious Man, that is Famous as well for his Writings as for a Remedy, wherewith he undertaketh to cure constantly the exulcerated Cancers of Womens Breasts, without any considerable paine: But having not yet had opportunity to make tryall of that which I have lying by mee, I shall onely tell you, he assures mee, That his Medicine is indolent, and mortifies the ulcerous part as far as they are corrupted, without disordering the party troubled with them; which I the lesse doubt, because, that (to adde thus much on this occasion) partly by the colour, &c. of his Powder, and partly by his owne Confession to mee, it seems to be a dulcification of *Arsenick*, first fixt with *Nitre*, and then carefully freed from its corrosivenesse, by very frequent Distillations of fresh Spirit of Wine. I shall ere long have occasion to teach you a Drinke, whereby exulcerated (but not Cancerous) Breasts have been very happily cured. The Learned *Bartholinus*, (in his late Observations) mentions the cure of some hurts in the Head; done without Trepanning, in cases where that formidable and tedious Operation is wont to be thought necessary. As for the terrible way of stopping the violent Bleeding in great Wounds, by seering the Orifices of the Vessels with hot Irons, it would be little needed, if we knew such Remedies as that which the Inquisitive *Petrus de Osma*, in his curious Letter to *Monardes* from *Pern*, mentions in this passage, which I finde among his other Observations: *Anno* (saith he) 1558. *in urbe D. Jacobi qua est in Provincia Chyle, quidam Indi captivi suras sibi amputarunt, & eas assas praefecerunt, & quod mirabile dictum ejusdam Plantae folia vulneribus imponentes, illic sanguinem sistebant.* I knew a rich Man, extreamly corpulent, who having long had a strange kind

*Apud Monard.
de simplic. medic.
lib. 84.*

kinde of *Fistula* in his Breast, and having travelled from one Country to another, to consult with the ablest Chirurgions, was at length brought to that passe, that at a Consult they resolved, by opening his Breast, to try if they could track the winding *Fistula*, and save his Life: And as the Instruments, for this sad operation, lay upon the Table, another famous Chirurgion casually coming into the House, told the Patient that he had an art of curing *Fistula's* without cutting them open, and without any considerable paine or trouble: whereupon the rich Man offering him what he pleased for the Cure, the Chirurgion quickly performed his promise, as the patient himselfe, who shewed mee his Breast, confessed to mee, and that by the use of an almost indolent Remedy, which he purchased of the Chirurgion, and which by his favour came to my hands: And that even very ill-condition'd *Fistula's* may be cured without Chirurgicall Operations, by Medicines taken at the Mouth, I shall ere long have occasion to shew you by a notable Example.

In the meane time I shall adde, That a Man, whom I suppose you have often seen, having a while since received such a kick of a Horse, as made the Doctor and Chirurgion that tended him, to conclude the part gangrenated, and the patients condition, by the accession of a Violent Feaver, so desperate, that they desired to meddle with him no longer, a large Dosis of Sir *Walter Rawleigh's* Cordiall, sent him by an excellent Lady you are nearly related to, not only freed him from his Feaver, and the *Delirium* that attended it, but, to the wonder of all that observed it, restored the Limb that was concluded gangrenated, to its former soundnesse.

Sir W. Rawleigh's Cordiall.

And to bring credit to all these Relations, I shall crowne them with that memorable passage of *Gulielmus Piso*, of as great things that he saw done by the illiterate *Indians* themselves:

What great use
the Indians
make of the
Juice of To-
bacco.

selves: *Memini* (saith hee) *in castris membra militum globulis sclopetorum icta, & jamjam ab Europæis Chirurgis, tam Lusitanis quam Batarvis, amputanda, barbaros recentibus gummi succis & Balsamis à ferro & igne liberâsse, & feliciter restituisse. Oculatus iidem testis sum in Nosocomiis relicta ulcera & gangrenas ab illis vel solo succo Tabaci curata.*

But, *Pyrophilus*, That the making of divers Helps to Recovery lesse distastfull, or lesse painfull to the Patients, is not the *only*, nor perhaps the *greatest* service that Chymistry may do him that attempts the Cure of Diseases, I shall now endeavour to manifest in some particulars.

CHAP. II.

That the search
of Nature by
Chymistry in
particular dis-
covers the qua-
lities of Medi-
cines.

AND first, The skilfull Naturalist, especially if a good Chymist, may much assist the Physician to discover the Qualities of Medicines: whether *Simple* or *Compound*; That the Experiments of the Spagyristes may much contribute to the examining those many things themselves prepare, you will, I presume, easily grant: That also divers Minerall Waters are of the nobler sort of Medicines, is sufficiently confessed on all hands; and 'tis knowne too, that the industry of Chymists hath produced some good directions towards the discovery of the Mineralls predominant in divers Medicinable Springs: But I am much mistaken, if they have not left much for others to do, which may be easily done. And I scarce doubt, but that by the various wayes that might be proposed, of trying what such Waters hold, and what saline or other Qualities are predominant in them, not onely the nature of those Medicinall Waters that are already used, might be more thoroughly understood; but undetected properties might in many others that are now not taken notice of, be discovered;
of

of some of which wayes of examining Mineral Waters, I may elfewhere give you an intimation. And I have made feveral Tryals that have, I confeſs, much inclined me to think, that the fault is rather in us, than either in Nature or Chymiftry, that Men do not, by the help of Chymical Experiments, diſcover more of the nature of divers Medicaments, than hitherto they ſeem to have ſo much as aimed at: For though the abſtrufe endowments of Specificks will not, I fear, be learned in haſte, otherwiſe than by particular Tryals and Obſervations; yet many Simples have other Qualities, which ſeem chiefly to reſide, though not in an Elementary Salt or Sulphur, yet in a part of the Matter that ſeems of kin to a Salt or Sulphur: ſuch as ſowerneſs, ſaltneſs, a cauſtick or a healing faculty, abſterſivenesſe, and the like, upon whoſe account ſuch remedies ſeem chiefly to work in a multitude of caſes. And towards the Investigation of ſuch Qualities, a Chymiſt may oftentimes do much, without making all his tryals in humane Bodies. But though, to illuſtrate this matter, I have ſometimes made ſeveral Experiments, yet not having now my Notes and obſervations at hand, I ſhall only mention a few things as they offer themſelves to my memory, reſerving the more diſtinct handling of this ſubject to another opportunity: And the rather, becauſe that till ſuch *Phænomena* have been more diligently obſerv'd, and reduced to their diſtinct ſorts, I would have them looked upon but as hints to further Enquiries, not as ſufficient Authority to ground general Rules on.

There are ſome Plants, whoſe Juices, eſpecially when the ſuperfluous moiſture is exhale or abſtracted, will, ſome by the aſſiſtance of a gentle Heat and Filtration, and ſome, even of themſelves, in time which I remember hath in ſome ſucculent Plants amounted but to a very few hours) coagulate

Of the Nitro-Tartareous Salt in some Vegetables,

in part into a kinde of Salt, which, if you please, you may call Essential: And by this Nitro-Tartareous Salt (as it seems to be) those Vegetables, whose Juice affords it (such as are, if I mistake not their names, *Parietaria*, *Borrag*, *Bugloss*, &c.) may be discriminated from those many others, from whence it is not (at least by the same way) to be obtained. And possibly also these Salts may, to a heedful Surveyor of them, appear to differ enough from each other in shape, taste, or other obvious Qualities, to deserve to be sorted into differing kinds.

If likewise we compare the Essential Salts and Spirits of these Plants, which those of *Scurvy grass*, *Brooklime*, and other Vegetables that are counted *Antiscorbutical*, and abound in Volatile and Saline parts: And if we also examine other Plants, by divers Chymical Operations, and observe not onely their disposedness or indisposition to yield Spirits or Oyles by Fermentation, or without it; but those other Particulars wherein they will appear to agree with, or differ from each other: there is little doubt but such Tryals will make them discover, to a considering Naturalist, much of their Nature and Properties, and especially of such as depend chiefly upon the plenty or paucity of the saline, unctuous, sowe, spirituous, lazy, tenacious or volatile Parts.

Difference in Operation between acid and alcalizate Salts.

It may be also observed, that the Infusion or Decoction of some Plants, as of *Brazil*, *Senna*, &c. will be heightened into a reddish colour, by putting *Alkalizate* Salts, as of *Tartar*, or of Pot-ashes, in the Water that extracts their Tinctures: Whereas acid Spirits, at least some of them, will much impair, if not destroy their colour; as a little *Aqua fortis* will immediately turn a red Tincture of *Brazil*, made in fair Water, into a pale yellow: Whereas on the other side, I have observed, that a small quantity of a strong Solution of Pot-ashes

ashes, drop'd into an Infusion of red-Rose leaves, hath presently turned it into a muddy colour, that seem'd to partake of green and blew, but was dark and dirty; whereas a little *Aqua fortis*, or good Spirit of Salt poured into the same simple Solution, did immediately turn it into a fine red, and so it would do to the muddy Mixture lately mentioned, if it were put to it in a far greater quantity. I observed also, that with a very strong (though clear and well filtrated *Lixivium* of Pot-ashes, I could precipitate some part of the Infusion or Decoction of red-Roses, which grosser parts, when the Mixture was filtrated through Cap-paper, remained like a dirty colour'd (though somewhat greenish) Mud in the Filtré; the fluid and finer part of the Mixture passing through in the form of a Liquor high coloured, almost like *Muscadine*.

And on this occasion, I remember, that as Galls, a very stiptick Vegetable excrescence, will yield a Decoction, with which, and *Copperis*, the common Ink is made; so divers other Plants, of notably astringent parts, may be employed to the like use: For, by casting *Vitriol* into a Decoction either of Oaken Bark, or red-Roses, or even a bare Infusion of either Log-wood, or *Sumach*, to name now no other Plants of the like nature, I have presently made a Mixture that might make a shift to serve for Writing-Ink; but whether all stiptick Plants or they only, will with *Vitriol* make an Ink, I refer to further Enquiry: And as a Solution of *Vitriol*, and the Decoction of the above-mention'd Plants, do precipitate each other to make Ink; so I remember I have tryed, that by dissolving the Chrystals of pure Silver (made the common way with *Aqua fortis*, or Spirit of *Nitre*) in a good quantity of fair Water, that the Liquor having no colour of its own, the colours it produceth in other Bodies may be the better observed, I found that I could with this Li-quor precipitate out

Of Ink made by the decoction of divers astringent Plants, with a little *Vitriol*.

Of some Metalline precipitations.

of the Infusions alone of several Vegetables, Substances differing in colour'd, according to their respective dispositions: And so I have found, with less cost, that *Saccharum Saturni*, which seems to be a kinde of *Vitriol* of Lead, whilst it lyes dissolved in the same Spirit of Vineger which extracted it from the Metal, being put to the bare Infusion of Log-wood, *Lignum Nephriticum*, red-Roses (to name those I now remember I made tryal of) they will precipitate each other.

That sulphurous Salts turn the expressed Juices of Vegetables into a green colour.

I might further adde, That I have tryed that sulphureous Salts, such as Oyle of *Tartar*, made *per Deliquium*, being drop'd into the expressed Juices of divers Vegetables, will, in a moment, turn them into a lovely Green, though the Vegetables were of colours differing from that, and from one another (as I remember one of those Vegetables, in which I expected, and found that change, was of a fine Carnation) And I could tell you, that though it be disputed whether Quick-lime have any Salt dissoluble in Water, and of what sort it is, the *Examen* of that Question may be much furthered, by trying, as I have done, that the Water of Quick-Lime, well made, will precipitate a Solution of sublimate made in fair Water, and will presently turn Syrup of Violets (which is Blew) if well mixed with it, into a fair Green, Experiments I say of this nature I might easily annex; but having already set down divers of them in what I have written concerning colours, I shall refer you thither: And now only adde this Observation, that the Investigation of divers Medical Qualities, even of Animal Substances, may be much assisted by che Naturalist, especially a Chymist; as we elswhere have by the Distillation of the *Calculus humanus* shewn, how much it differs from the Stones that are found in the Earth. And if you take those hard Concretions, found at certain times in the Heads of Craw-Fishes, that are wont

Of the distillation of the *Calculus humanus*, and of the Concretions that are called *Lapides Canisiorum*.

to

to be called *Lapides Cancræum* and commit some of them to Distillation, and infuse some in Vineger, and others in old Rhenish-wine, or strong White-wine, you will probably discover some thing of peculiar in the nature of this Concrete, of which I may possibly elsewhere make further mention to you: And not onely so, but in some Animal Substances, you may, by fit Experiments, discover notable Changes to be made, and their Qualities to be much heightened, when the Eye scarce perceiveth any Change at all, as I have purposely observed, in keeping Urine in close Glasses, and a moderate heat for many Weekes: For at the end of that time, the Virtues that depend upon its volatile Salt will be to heightened, that whereas upon putting Spirit of Salt to fresh Urine, the two Liquors readily and quietly mixed, dropping the same Spirit upon digested Urine, there would presently ensue a Hissing and Ebullition, and the volatile and acid Salts would, after a while, concoagulate into a third Substance, somewhat of the nature of *Sal Armoniack*. And whereas the Syrup of Violets, formerly mentioned, being dissolved in a little fresh Urine, seem'd to be but diluted thereby, a few drops of the fermented Urine tempered with it, did presently turne into a deep Green: And the same digested Urine being dropped upon a Solution of Sublimate made in faire Water, presently turned it white, by precipitating the dissolved Mercury. With what (various) successse we have likewise made upon some other parts of a humane Body, as well consistent as fluid, some Tryals, analogous to what we have recited of Urine, I may *elsewhere* perchance take notice to you: But of such kinde of Observations I must give you but this Hint at *present*.

The Changes in Animal Substances made by Fermentation only, particularly in Urine.

Of the mixture of Spirit of Salt with digested Urine.

CHAP. III.

That the search
of nature addes
much to the
*Materia Me-
dica.*

S*Secondly*: By these and other wayes of investigating the Medicall Qualities of Bodies, the Naturalist may be enabled to adde much to the *Materia Medica*: And that two severall wayes.

By employing
bodies hitherto
not employed.

Of Remedies
newly prepared
out of *Zinck*.

The Cure of
the Dropsie by
the Pill *Lun-
nards.*

For he may by his severall wayes of tryall, and by his Chymicall preparations discover, that divers Bodies, especially of a Minerall nature, that are as yet not at all imployed by Physicians, at least internally, may be brought into use by them; and that others that are naturally so dangerous, as to be used but in very few, and for the most part extreame cases, may with safety be more freely employed. Some Moderne Chymists (as particularly *Glauberus*) have of late prepared Remedies not unusefull out of *Zinck* or *Spelter*. And I have already mentioned unto you an excellent Medicall use of Silver, of which, prepared (as is there intimated) I have now this to adde, That since I began to write of it to you, I met with a considerable person, who assures mee, That she her selfe was by the use of it in a short time, cured of the Dropsie, though, by reason of her having a Body very corpulent, and full of humours, she have been thought more than ordinarily in danger of that stubborn Disease. I have sometimes wondered, that there hath been so little care taken by Physicians, and even by Chymists, to investigate the Qualities of Minerall Earths, and those other resembling Bodies, that are, or may be, plentifully enough digged up in most Countries, though not the selfe same in all, for however men are pleased to passe them slightly over, as if they were but Elementary Earth, a little stained, or otherwise lightly altered: I have seen great variety of them, that have been digged sometimes within

within the compasse of a little spot of Ground: and the differences of divers of them, both as to colour, taste, consistence, and other Qualities, have been too great, not to make me suspect they were of very differing natures. And the true *Bolus Armenus*, and the *Terra Lemnia*, which is now brought us from the Island that gives it that name (mark'd with a Seal, which makes many call it *Terra sigillata*, though that name be for the same reason applyed to the *Terra Silefiaca*, and other Medical Earths) have been so esteemed, both by Antient and Modern Physicians, as well against Malignant Diseases, and the Plague it self, as against divers other Distempers; that it is the more strange, that (since the greatest part of those two Earths, that are now brought into our Countries, have not, as the more skilful complain, the true marks of the genuine Earths, whose name they bear) Physicians have not been more careful to try whether their own Countries could not furnish them with the like, or as good, especially in regard some of the few attempts of that nature, that have of late times been made, may give them much encouragement. For, not to believe the boasts of the *Silesian Johannes Montanus* (who passeth for the Inventor of the *Terra Sigillata Silesiaca Strigoniensis*) in the Writing he published of the vertues of it, That it is Gold prepared and transmuted, by provident Nature, into an admirable Medicine; I find that Learned Physicians prefer it before the *Lemnian* Earth, that is now brought from *Turky*: And the experienced *Sennertus* gives it this commendation, *Experimentis* (saith he) *multis jam probatum est, ejus insignes esse vires contra pestem, febres malignas, venenatorum animalium morsus, diarrhæam, dysenteriam*: What he addes, that the Chymists name it *Axungia solis*, brings into my mind (what I shall hereafter have occasion to mention more particularly to you)

Of the use of
divers Medical
Earths.

Epitome Scientiæ naturalis.
lib. 2. cap. 1.

Instances of
Gold and di-
vers noble
Menstruums
drawn out of
them,

that I had once brought me a certain Earth, by a Gentleman that digged it up in this, or some neighbouring Country, which though it seemed but a Mineral Earth, did really afford, to a very expert tryer of Metals of my acquaintance, a not despicable proportion of Gold. They have also found in *Hungary*, an Earth, which they call *Bolus Tockavienfis*, which is affirmed by *Crato* (in *Sennertus*) to melt in the Mouth like Butter, and to have all the other proofs of the true *Bolus Armenus*, and therefore is, by that Judicious Physician, preferred before the Modern *Bole-armony*, even that which was brought out of *Turky* to the Emperour himself; and he relates, not only its having succeeded very well against *Catarrhs*, but his having experimentally found it of great efficacy in the Plague, that reigned in his time at *Vienna*. To which I shall adde, That a very Learned and Successfull English Doctor, now dead, did some years since, during a great Plague that then raged in the City where he lived, find a vein of red Earth, not very far from that Town, and prescribed it with very good successe in Pestilential Feavers, as I was informed by an Ingenious Friend of his, that used to administer it, and shewed me the place where he digged it.

I remember also, the experienced Chymist *Johannes Agricola*, in his Notes upon what *Poppius* delivers of *Terra Sigillata*, after having much commended the *Terra Silefiaca* in divers Diseases, and equalled it to the best of *Turky*, where he had travelled, relates one strange thing of it, with many Circumstances, and in a way as if he spoke upon his own tryal, namely, That the Spirit of *Terra Sigillata*, by which I think he means the *Strigonienfis*, doth, though slowly, dissolve Gold as well as an *Aq. Regis*, and that into a red Solution; whence in two or three dayes the Gold will fall of itself into a very fine and subtile Powder. And the same Au-
thor

thor tells us, That he hath seen another Earth digged at the *Rheinstran*, not far from *Westerwaldt*, which was more inclinable to white then to yellow, which is preferable to the *Silesian*, and gives more Salt then it, and dissolves Silver better then other *Menstruums*; since, as he saith, the Silver may thereby be easily made potable, and be prepared into a very useful Medicine for the Diseases of the Head. And for my part, I do not much wonder at the efficacy of these Earths, when I consider, that divers of them are probably imbued, as well as dyed, with Mineral Fumes; or tinged with Mineral Juices, wherein Metals or Minerals may lie, as the Chymists speak, *in solutis principis*; in which form, having never endured the Fire, many of their usefulest parts are more loose and volatile, and divers of their vertues less locked up, and more disposed to be communicative of themselves, then they are wont to be, in a more fixed or coagulated state, or when they have lost many of their finer parts by the violence of the Fire.

Besides, there are several Mineral Bodies, which though perhaps they may not be of themselves fit for the Physicians use, may, by addition of some other convenient Body, or by sequestration of the more noxious parts, or by some such other Chymical Preparation, as may alter the Texture of such Minerals, be rendered fit to encrease the *Materia Medica*. As I have known, that by a preparation of *Arsenick*, with Salt-Peter, whereby some of the more volatile and noxious parts are driven away, and the remaining Body somewhat fixed and corrected by the *Alkali* of the *Nitre*, it hath, by a farther dulcification with Spirit of Wine, or Vinegar, been prepared into a kind of *Balsamum fuliginis*, which wonderfully cured a Physician of my acquaintance, as he himself

Of Medicines
out of Arse-
nick.

confessed to me, of dangerous Venereal Ulcers (divers of which penetrated even to the *Meatus Urinarius*) which had reduced him to great extremity.

And out of
Bismutum.

Apud Schro-
derum in
Pharmacop.
lib. 3. cap. 18.
Dr. J. C.

And though *Bismutum* have not, that I know, till very lately been used, unlesse outwardly, and especially for a Cosmetick (hereafter to be taught you) yet the Industrious Chymist, *Samuel Clossius*, by calcination and addition of Spirit of Vinegar, and *Cremor Tartari*, makes two Medicines of it, which he highly extols in the Dropsie, and (to reserve for another place, what I have tryed upon Tin-glasse) a very expert Chymist of my acquaintance, doth by preparing it with common Sublimate (carried up by which, I remember it hath afforded a very prettily figured Body) make it into a white Powder (like *Mercurius vita*) which he assures me he finds, in the Dose of a few Grains, to purge very gently, without being at all (as *Mercurius vita* is wont to prove, violently enough) emetick.

Of the correcti-
on of Poisonous
Medicines.

2. But the Naturalist may adde to the *Materia Medica*, not only by investigating the Qualities of unheeded Bodies, but also by gaining admittance for divers, that, though well enough known, are foreborne to be used upon the account of their being of a Poisonous nature; for by digestion with powerful *Menstruums*, and some other skilfull wayes of Preparation, the Philosophical Spagyrist may so correct divers noxious, nay poysonous Concretes, unfit in their crude simplicity for the Physicians use, at least in any considerable quantity, as to make them useful and effectual Remedies. *Helmont*, who, though frequently extravagant in his Theory of Physick, doth often make no bad estimate of the power of Remedies, after having told us, That he adored and admired the Clemency and Wisdome of God, for creating Poysons, gives this account of his so doing: *Nam venena* (saith he)

voluit

noluit nobis esse venena aut nocua. Nec enim Mortem fecit, nec Medicamentum exterminii in terra: sed potius ut parvo nostri studio, mutarentur in grandia amoris sui pignora, in usuram mortalium, contra futurorum morborum savitiem. In illis nempe latitat subsidium, quod benigniora & familiaria Simplicia recusant alia. Ad majores & heroicis medentum usu venena tam horrida servantur. And though I would not forbid you, *Pyrophilus*, to think there is some *Hyperbole* in the *Encomiums* he here and elsewhere gives Poysonous Simples; yet when I consider, what great things are oftentimes performed by *Antimony*, *Mercury*, and *Opium*, even in those not over-skilfull wayes of preparing them, that are divers of them vulgarly used by Chymists, especially when the preparations are (which doth seldome happen) rightly and faithfully made: I can scarce think it very unlikely, that those active Simples may, by a more skilfull way of ordering and correcting them, be brought to afford us very noble Remedies And the same Examples may in part prevent the main Objection that I can foresee in this case, which is, That whatever corrects Poysons, must, with their virulency, destroy their activity; for the above-named Simples, though so prepared as to be Medicines safe enough, have yet activity enough left them to let them be very operative, their energy being, by preparation, not only in part moderated, but in part so over ruled, as to work after a more innocent manner: as in *Bezoardicum Minerale*, *Skilfully prepared* (for it very seldom is so) the laxative and emetick virulency of the *Antimony* is changed into a diaphoretick, resolving and deopplative power; which probably made the experienced *Riverius* (though counted a *Galenist*) so particularly recommend this Medicine to Physicians, which if I be not mistaken, may well be praised without being flattered: And *Helmont* sup-

*Helmont. in
Pharmac. &
dispens. Modern.
num. 46.*

Helmont.
Tractat. supra
allegato.
Num. 46, 47.

The preparati-
on of *Asarum*
turns it from
being emetick
to be notably
diuretical.

Helmont.
pag. 466.

Helmont. de
Lithiassi.
lib. 7. cap. 32.

Instances in
some of the
Secret Men-
struums.

plies me with an easie Experiment to our present purpose, by telling us, That *Asarum*, which when crude, doth, as is well known, provoke Vomits, by a slight preparation (presently to be mentioned) is so altered, that its virulency is changed, to use his expression, *in deoppilans, diureticum tardarum februm remedium*; which I the rather take notice of, because I find, upon enquiry purposely made of some Ingenious Physicians of my acquaintance, that upon tryal, they commend this preparation of *Helmont's*, and confesse, that by it the *Asarum* loseth its emetick, and acquires a diuretical Quality.

Now that all other Animal and Vegetable Poysons may be corrected, without losing their force with their virulency, is the affirmation of *Helmont* concerning *Paracelsus's* and his *Sal Circulatum (majus)*. And as for Vegetables, he elsewhere tells us, That the *Lapis Cancrorum* resolved in *formam*, as he speaks, *pristina lactis, habet remedium contra inclementias multorum vegetabilium vi laxante infamium*. And I remember that I knew two Physicians, the one of which affirmed to me, his having seen tryal made (by the help of a noble *Menstruum*) of what *Helmont* here teacheth, and found it true; the other a person severe, and apt enough to dissent from *Helmont*, assured me, That with the volatile Salt of *Tartar*, he had seen Vegetable Poysons, and particularly **Napellus*, so corrected by a light digestion with it, that it lost all its Poysonous Qualities; for proof of which he freely offered me, to take himself as much of that fatal Herb as would kill three or four Men (but at that time, and in that place, I could not get any of the Plant to make the Experiment with.) And though I shall say nothing now concerning *Helmont's Sal Circulatum*, yet as to the volatilization of the Salt of *Tartar*, what I have seen, scarce permits me to doubt that
it

it is possible. And if I could now clearly acquaint you with my reasons, you would perchance, not wonder to find me inclinable to think, that some such Methods (perhaps a *Menstruum*) may be found to correct poisonous Simples, without rendring them ineffectual: And though it must be some very powerfull Corrective, whether Salt or Liquor, that shall be able to correct any store of differing Poysons; yet it is not irrational to think, that divers particular Concretes may be prepared without any such abstruse or general Corrective, some by one way of handling it, and some by another: And in such cases, skill, in the natures of particular Bodies to be mannaged, or lucky hits, may supply the place of a meliorating Dissolvent, of which *Helmont* affords me a considerable Instance, where he teacheth (in the place lately quoted) That the emetick property of *Asarum* may be taken away, and the Plant turned into a noble diuretick, only by boyling it a while in common Water. And whereas a wary Man would be apt to suspect, that this change is made but by the avolation of some subtile parts, driven away by the heat of the boiling Water, I find that our Author affirms, that though it be boyled with the like degree of Fire in Wine, instead of Water, it will not so lose its violence. I have known white *Hellebor*, *Opium*, and some other noxious Bodies, so preparéd, as to be given not only harmlesly, but successfully in such quantities, as were they not skilfully corrected, would make them pernicious. We daily see, that the violent emetick and cathartick properties of *Antimony*, may singly, by calcination with *Salt-peter*, be destroyed. And (which is though a known, yet a notable Experiment among Chymists) *Mercury* sublimate may be deprived of its deadly corrosivenesse, and prepared into a Medicine inoffensive even to Children, by bare resublimations with fresh *Mercury*. And to

That the proportion of *Asarum* is only the boyling it in common Water. *Helmont. in Pharmacop. & dispens. Modern. N. 46. 47.* That the boyling in Wine alters not its violence. That the emetick and Cathartick properties of *Antimony*, are destroy'd by calcination with *Salt-peter*, and *Mercury* sublimate be deprived of its corrosivenesse by bare resublimations with fresh *Mercury*.

A strange
correction of
the flowers of
Antimony.

give you one instance more of what the knowledge of the effects of Chymical Operations, and of the disposition of a particular Body, may enable a Man to do, in changing the pernicious nature of it; I shall adde, that the violently vomitive Flowers of *Antimony*, which our wonted, though sumptuous and specious Cordials are so unable to tame, I can shew you (which perhaps you will think strange) so corrected, without the addition of any thing besides *heat* and *skill*, that in a treble Dose, to that wherein they are wont to be furiously emetick, we have not found them to work otherwise then gently by sweat: But some more Particulars applicable to our present purpose, you will meet with by and by.

C H A P. IV.

That the Naturalist may assist the Physician to make his Cures lesse chargeable.

T^Hirdly, And now, *Pyrophilus*, that I am speaking of the service that the Naturalist may do Physick, I must not pretermitt that he may assist the Physician to make his Cures lesse chargeable: For though to cure cheaply, be not properly, and in strictness any part of the end of the Art of Physick, which considers mens Health, and not their Purse; yet it ought in Charity, if not also in Equity, to be the endeavour of the Physician, especially when he dealeth with Patients that are not rich. For not now to say any thing of the Fees of Physicians, which in some places are not very moderate, it is certain that the Bills of Apothecaries, especially in Chronical Diseases, do often prove so chargeable, that even when the Remedies succeed, by that time a poor Patient is recovered, he is undone, and payes for the prolongation of his Life, that which shoud have been his Lively-hood: Whence it comes to passe, that the more necessitous sort of People are either fain to languish unrelieved, for want of being able to purchase

purchase health at the Apothecary's rates ; or are deterred from applying themselves to the Physician, till their Diseases have taken too deep roote to be easily, if at all , eradicated : And this oftentimes, not more through the fault of the Apothecary, than of the Doctor, who in his Prescriptions might, for the most part , easily direct things that would be much more cheap, without being much lesse efficacious.

Now there are severall particulars, wherein it may be hop'd, that the Naturalist may assist the charitable Physician to lessen the charge of his Patients.

And first, He may perswade the Physician to decline that more frequent than commendable custome, of stuffing each *Recipe* with a multitude of Ingredients: 'Tis not that I approve the practice of some Chymists, who too freely censure the compounding of Simples ; for I know, at some times, a complicated Distemper requires in its Remedy more Qualities, than are, perhaps, to be met with in any of the knowne Simples that the Physician hath at command (though one and the same Simples may sometimes answer divers Indications, as a Plant that is hot and dry, may serve for a Distemper that is cold and moist :) And I know too, that in some cases to that Ingredient, that is as it were the Basis of the Medicine, other things must be added either to correct its noxious Qualities, or to allay its vehemence, or to serve for a Vehicle to convey it to the part affected, or to make it easier to be taken by the patient, or to preserve it from corruption, or for some such like reason. But yet I thinke Physicians may well be more sparing, as to the number of the things prescribed, than most of them use to be, both to save charges to their Patients (upon which account it is that I here mention it) and for other considerations. For the addition of needlesse Ingredients adding to the bulke of the Medicine, makes it but the

Inconveniences
of stuffing Re-
ceipts with a
multitude of
Ingredients.

more

more troublesome to be taken, and the more apt to clog the Stomach: And oftentimes the Efficacy of the more useful Ingredients, as well as their Quantity in each Dose, is much abated, by their being yoked with those that are less appropriated, or less operative. Besides, it seems a great impediment to the further discovery of the Virtues of Simples, to confound so many of them in Compositions: For, in a mixture of a great number of Ingredients, 'tis so hard to know what is the operation of each, or any of them, that I fear there will scarce in a long time be any great progress made in the discovery of the virtue of simple Drugs, till they either be oftener employed singly, or be but few of them employed in one Remedy. And besides all this, whereas when one of these Mixtures is administered, the Physician expects but such operations as are suitable to the Quality which he conceives will be predominant in the whole Compound; several of the Ingredients may have particular Qualities that he dreams not of, which working upon a Body, that the Physician considers as subject only to the Sickneſs he endeavours to cure, may therein excite divers latent Seeds of other Distempers, and make new and unexpected commotions in the Body. On which occasion I remember, that whereas Parsley is a very usual Ingredient of aperitive and diuretick Decoctions and Apozems, a famous and learned Oculist tells me, he hath very often observed, That when he hath unawares, or for tryal sake employed Parsley, either inwardly, or even outwardly to those that were troubled with great Distempers in their Eyes, he found the Medicines wherein that Herb was but one Ingredient among many, to cause either great pain or inflammation in the Eyes. In confirmation of which, I shall adde, that a while after having a slight Distemper in my Eyes, I one day found it upon a sudden strangely encreased, without being

ing able to imagine whence these new Symptoms proceeded; till at length, recalling to mind all I had done that day, I remembered, that at Dinner I had eaten Sawce wherein there was a pretty deal of Parsley mixt with other things. And whereas in divers of these Compositions some noxious Ingredients are allowed, upon a supposition that their ill Qualities will be lost, by their being, as it were, tempered with the rest, though this may sometime happen, yet it would be considered, that in Treacle (especially at one age of it) the *Opium* doth not, considering the small proportion of it to the rest of the Ingredients, loose much, if any of its power, by being mingled with sixty odde other Drugs, which Composition possibly owes much of its virtue to that little *Opium*. And perhaps one reason why those that accustom themselves to be ever and anon taking Physick, though they often escape dangerous Diseases (by preventing the accumulation of humors, and taking their Sickneses at the beginning) are yet almost ever troubled with one Distemper or other, may be, That by the multiplicity of Medicines they take into their Bodies divers things are excited to disorder them, which otherwise would have lain quiet. I am not ignorant that it may be alledged, That in compounded Medicines as *Treacle* and *Mithridate*, how many soever the Ingredients be, they do so clog and temper one anothers activity in the composition, that there results from them all, one or more Qualities fit for the Physicians turn, and which is the thing he considers and makes use of. And I confess, that in some cases this Allegation doth not want its weight: For I consider, that a decoction of Galls, and a solution of *Copperas*, though neither of them apart be blackish, will, upon their mixture, turn to Ink: And that when Brimstone, Salt Peter, and Coals are well mingled together in a due proportion, they make Gun-Powder, a

mixture that hath Qualities much more active than any of the severed Ingredients. But I fear, that when a multitude of Simples are heaped together into one compound Medicine, though there may result a new *crasis*, yet 'tis very hard for the Physicians to know before-hand what that will be; and it may sometimes prove rather hurtful than good, or at least by the coalition the virtues of the chief Ingredients may be rather impaired than improved: As wee see that crude *Mercury*, crude *Nitre*, and crude *Salt*, may be either of them safely enough taken into the Body in a good quantity; whereas of sublimate, consisting of those three Ingredients, a few Grains may be rank Poyson. As for those fam'd Compositions of *Mithridate*, *Treacle*, and the like, though I cannot well, for the mention'd Reasons, commend the skill of those that first devised them, and though I think that when one or two Simples may answer the same Indications, they may for the same Reasons be more safely employed; Yet I would by no means discommend the use of those Mixtures, because long experience hath manifested them to be good Medicines in several cases. But 'tis one thing to employ one of these Compositions, when tryal hath evinced it to be a lucky one, and another thing to think it fit to rely on a huddle of Ingredients, before any tryal hath manifested what kinde of Compound they will constitute. And, in a word, though I had not the respect I have for *Matthiolus*, and other famous Doctors that devised the Compositions, whereinto Ingredients are thrown by scores, if not by hundreds, yet however I should not reject an effectual Remedy, because I thought that it proved so rather by chance, than any skill in the Contriver: and I think a wise Man may use a Remedy, that scarce any but a Fool would have devised.

Another

Another thing, upon whose account the Naturalist (whom we here suppose an expert Chymist) may assist a Physician to lessen the expensiveness of his prescriptions, is by shewing, That in very many Compositions, several of the Ingredients, and oftentimes the most chargeable, whether they be proper or no for the Disease, are unfit for the way of management prescribed, and consequently ought to be left out. I need not tell you, that since Chymistry began to flourish amongst us, very many of the Medicines prepared in Apothecaries shops, and commonly the most chargeable, are distilled Waters, Spirits, and other Liquors: And he that shall survey the Books and Bills of Physicians, shall finde that (very few perhaps excepted) the most usual Prescription is to take such and such Ingredients (for the most part numerous enough) and pouring on them either Water or Wine, if any Liquor at all, to distill them in *Balneo*, rarely in Ashes or Sand. But I confess I have not without wonder, and something of indignation, seen in the Prescriptions of Physicians, otherwise eminently Learned Men, and even in the publick Dispensatories, know not how many things ordered to be distilled with others in *Balneo*, which in that degree of heat will yield either thing at all, as the fragments of Precious Stones, Leaves of Gold, prepared Pearl, &c. Or if they do yield any thing that hath not been yet, that I know of, evinced) do properly yield but a little nauseous Phlegm, or at least some loose parts, far less efficacious than those that require a longer heat to drive them up: Such as Sugar, Raisins, and other sweet Fruit, Bread, Harts-horn, Flesh prepared by Station, &c. which though wont to be thrown away with *Caput Mortuum*, oftentimes there retain their pristine texture and Nature, or at least are almost as much more considerable, than that which they yielded in Distillation: as a

boyled Capon is, than the Liquor that sticks to the cover of the Pot. And though as to some of these Ingredients it may be thought that they may yield even in *Balneo* some of their useful parts, yet this can, with any probability, be supposed but of some of such Ingredients: And even as to them it is but suppos'd that they may yield something in so mild a heat, and how that something will be qualified, is but presumed: at least, by the Analogy of the Experiments vulgarly made, there seems so small cause to expect, that these more fixed Ingredients will adde half so much to the virtue of the Medicines, as they will to the cost; especially since though it could be proved, or were probable, that fixed Substances may communicate their virtues to Wine or Water, yet it would not follow that those impregnated Liquors, distilled in *Balneo*, will carry those virtues with them over the Helm. All which I have more largely proved in another Discourse, where I shew both that the nobler parts of many Ingredients wont to be distilled in *Balneo*, do commonly remain in the *Caput Mortuum*; and that 'tis very unsafe to conclude alwayes the Virtues of distilled Liquors from those of the Concretes that afforded them.

But there is another way of putting unfit Ingredients into Medicines, by confounding those in one Composition, which, though perhaps they might apart be properly enough employed, do, when mixed, destroy or lock up the Virtues of one another, and of this fault, even famous Chymists themselves are but too often guilty. I know not how many Proceses I have met with, wherein saline Substances, of contrary natures, are prescribed to be mingled, as if because they were all of them saline, they must be fit to be associated; whereas 'tis evident to any Man, that considers as well as employs the Operations of Chymistry, that there

there are scarce any Bodies in the World betwixt which there is a greater contrariety, than betwixt acid Salts: and as well those that the Chymists call volatile, as the Spirits and Salts of Harts horn, Blood, Flesh, and the like, as those others which are made of Incineration, as Salt of *Tartar*, and of all burnt Vegetables. So that oftentimes it happens, that by an unskilful Mixture, two good Ingredients are spoiled; as when Vinegar, Juice of Lemmons, Juice of Barberries, and the like, are prescribed to be distilled with other Ingredients, whereof the Salt of Wormwood or some other Plant makes one; for then the *acid* and *alcalizate* Salts working upon one another, grow more fixed, and yield in *Balneo* but a Flegm: and so Spirit of Urine, which is highly volatile, and Spirit of Salt, which is also a distilled Liquor, being mingled together, will, by their mutual Operation, constitute a new thing, which in such a heat as that of a Bath, will yield a Flegm, leaving behinde the nobler and active Parts concoagulated into a far more fixed Substance, much of the nature of *Sal Armoniack*. And indeed where Salts, especially active ones, are made Ingredients of Mixtures, unless they be skilfully and judiciously compounded, it often happens that they spoil one another, and degenerate into a new thing, if they do not also spoil the whole Composition, and of divers useful Ingredients compose one bad Medicine.

That *acid* and *alcalizate* Salts being mixed grow thereby more fixed, and yield in *Balneo* but a Phlegm.

The same is observed of the Mixture of the Spirit of Urine (by it self highly volatile) and Spirit of Salt.

CHAP. V.

ANother way by which the Naturalist (skilled in Chymistry) may help to lessen the chargeableness of Cures, is by shewing, that as to divers costly Ingredients, wont to be employed in Physick, there hath not yet been sufficient proof given of their having any Medical Virtues at all, or that at least

That the naturalist discovers the misapplication and use of Gems & divers other costly Ingredients.

least as they are wont to be exhibited, either crude, or but slightly prepared in *Juleps, Electuaries, &c.* there is not any sufficient evidence to persuade us, that their efficacy is as much greater, than that of many cheap Ingredients, as their price is. I am not altogether of their mind, that absolutely reject the internal use of Leaf-Gold, Rubies, Saphyrs, Emeralds, and other Gems, as things that are unconquerable by the heat of the Stomach: For as there are rich Patients that may, without much inconvenience, go to the price of the dearest Medicines; so I think the Stomack acts not on Medicines barely upon the account of its heat, but is endowed with a subtle dissolvent (whence soever it hath it) by which it may perform divers things not to be done by so languid a heat. And I have, with Liquors of differing sorts, easily drawn from Vegetable Substances, and perhaps unrectified, sometimes dissolved, and sometimes drawn Tinctures from Gems, and that in the cold. But though for these and other Considerations, I do not yet acquiesc in their Reasons, that laugh at the administration of crude Gems, &c. as ridiculous; yet neither am I altogether of their Adversaries mind. For though I deny not the Glass of *Antimony*, which looketh like a kind of Gem or Ruby, will easily enough impart to Liquors an emetick Quality; yet I know too, there is great odds betwixt Rubies and other Gems (which will endure violent Fires, and remain undissolved in divers strongly corrosive Liquors) and the Glass of *Antimony*, which is a body so far less compact and fixed, that Spirit of Vinegar it self will work upon it, and a strong Fire will, in no long time, dissipate it into smoak. But that which I chiefly consider on this occasion, is, That 'tis one thing to make it *probable*, that 'tis *possible*, Gold, Rubies, Saphyrs, &c. may be wrought upon by a humane Stomach; and another thing to shew both that they

A difference between the fixedness of a Gem, and of Glass of *Antimony*.

they *are wont* to be so, and that they *are* actually endowed with those particular and specifick Vertues that are ascribed to them: Nay, and (over and above) that these Vertues are such and so eminent, that they considerably surpass those of cheaper Simples. And I think, that in Prescriptions made for the poorer sort of Patients, a Physician may well substitute cheaper Ingredients in the place of these precious ones, whose Vertues are not half so unquestionable as their Dearth.

What strange Excellency there may be in the *Aurum Potabile*, made by a true *Adeptus*, or by a Possessor of the Liquor *Alchabest*, I shall not now dispute, not knowing what powerfull and radical Dissolvents, the profound skill of such Men (if any such there be) may furnish them with, to open the Body of Gold. But as for the attempts and practices of the generality of Chymicall Physicians to make Gold potable, besides that, their attempts to make their Solutions volatile, succeed so seldom, that even Learned Physicians, and Chymists, have pronounced the thing it self unfeasible; I confesse, I should much doubt whether such a potable Gold would have the prodigious Vertues its Encomiasts ascribe to it, and expect from it: For I find not that those I have yet met with, deliver these strange things upon particular Experiments duly made, but partly upon the Authority of Chymicall Books, many of which were never written by those whose Names they bear. And others, I fear, commend *Aurum Potabile*, prepared after another guesse manner than that we are now speaking of, partly upon a presumption that if it be made volatile, it must be strangely unlocked, and exalted to a meer Spiritual Nature; and partly upon rational Conjectures (as they think them) drawn from the noblenesse and preciousnesse of Gold. But for my part, though I have

Concerning
Aurum Potabile.

long since bethought my self of a way, whereby I can, in a short time, and a moderate Fire, make my *Menstruum* bring over crude Gold, in quantity sufficient to make the Liquor look at the first or second Distillation, of a high golden colour; yet finding that I could, by an easie Art, quickly recover out of this volatile Liquor, a corporal and malleable Gold, I dare not brag that my Tincture (as an Alchymist would call it) must needs do strange feats, because there is so noble a Metal brought over in it. And if this or other preparations of *Aurum Potabile* prove good Medicines, it would be further enquired, whether the Vertues may not in great part be rather attributed to the *Menstruum*, than the Gold (that requiring a very subtile Liquor to volatilize it) or to the association of the Corpuscles of the Gold, with the saline Particles of the *Menstruum*, into a new Concrete, differing enough from Gold, though never so well opened. And as for the noblenesse and preciousnesse of this Metal, That depends upon the Estimation of Men; whence in *America* the *Indians* that abound with it, had not such a great value for it. And in divers Countries, at this day, it is postponed to Iron or to Copper, and hath rather a Politicall (if I may so speak) then a Natural Vertue. Nor will it follow, that because it is the fixed'st and pretious'est of Metals, that therefore it must be an admirable Medicine: For we see that Diamonds, though they be the hardest of Bodies, and very fixed ones, and in much greater esteem, *ceteris paribus*, then Gold; are yet so far from being accounted highly Medicinal, that they are commonly (though, perhaps, not so deservedly) reckoned among Poysons. But I see I have digressed. That which I chiefly aimed at, being to inculcate, that, whether Gold and Gems, and the like precious Ingredients, may be good Medicines or no, it were a good work to substitute cheap ones for the poorer
 sort

sort of Patients; and that Physicians are much to blame who prize Simples, as Drugsters do, according as they are brought from remote Countries, and are hard to be come by and cannot imagine that what doth not cost much Money in the Shops, can do much good in the Body; as if God had made Provision only for the Rich, or those People that have Commerce with *China* or the *India's*: whereas indeed it may oftentimes happen, that what the Chymists call their *Caput Mortuum*, and perhaps throw away as an useles *Terra Damnata*, may have as great Vertues as those nobler Parts, as they call them, which they have extracted from it; and a despised Simple, nay even an Excrement or an Insect, may in some cases prove nobler Remedies, then those that Men call and think very noble Bodies, not to say, than I know not how many Extracts and Quintessences.

Examples of great Medicines drawn from unpromising Bodies.

I shall not trouble you with many Instances to prove this Doctrine, having more fully discoursed of it, in one part of another * Treatise: But yet some Instances I suppose you will here expect, and therefore I shall present you with a few of those that at present come into my mind.

* Of the efficacy of unpromising Medicines.

When the Distillation of *Aqua fortis* is finished, the *Caput Mortuum*, as deserving that name, is wont, by common Distillers, to be thrown away; and I have seen whole heaps of it thrown by, as uselesse, by those that make *Aqua fortis* in quantity to sell it: And yet this despised Substance doth, in common Water it self, yield a Salt, which being only depurated by frequent Solutions and Filtrations, is that famous *Panacea Duplicata*, or *Arcanum Duplicatum*, which that great *Virtuoso* and knowing Chymist, The Duke of *Holstein*, whose name it also beareth, thought worth purchasing at the rate of Five hundred Dollars; and of which the Princes experienced Physician thus writes to the Industrious

The D. of *Holsteins Panacea duplicata* is made of the vulgarly despised *Caput Mortuum* of *Aqua fortis*.

Schroder.
Pharmacop.
lib. 3. cap. 23.

Schroder. Mille experimentis salis hujus Efficaciam *Antia* nostra comprobavit in melancholicis affectibus, febribus quibuscunque continuis & intermittentibus, calculo, scorbuto, &c. Quin & somnum conciliasse praesertim in Melancholicis non semel notavimus. Dosis à scrup. 1. ad scrup. 2. Libras aliquot quotannis absumimus. And another very skilfull Physician that frequented that Excellent Princes Court, confirmed to me the same Medicines diuretick and deoppilative Vertue: (But upon my own Experience I can say little of it, having casually lost a great quantity I caused to be prepared to make tryal with, before I had opportunity to imploy it.

Flores Colcotharini are made of the Caput Mortuum of Vitriol.

But whereas in the *Caput Mortuum* of *Aqua fortis* there remains pretty store of easily-soluble Salt; In the *Caput Mortuum* of *Vitriol*, when not only all the Oyle is forced away by the Fire, but all the fixed Salt is exactly separated by Water, There seems to remain nothing but a worthlesse *Terra Damnata*: And yet it is of this, that, as I shall teach you ere long, I make those *Colcotharine* Flowers, which are possibly a nobler Medicine then either the Oyle, the Spirit, or the Salt of *Vitriol*.

Bontius in cap. 45. *Garcia ab Orta*. A Comparison between the Bezoars Stone, and the Stone cut out of Mans Bladder.

• As for the *Bezoar-stone*, which is so often prescribed by Physicians, and so dearly paid for by Patients, the experienced *Bontius*, a very competent Witnesse in this case (and whose account of the manner of its generation, agrees the best of any I have seen with that I received from an Intelligent Person, that was employed into *Persia* by the late King) hath in one place a Passage concerning it; and elsewhere writes such things of the Stone cut out of a Mans Bladder (though that, whilst crude, be despised as a thing vile and uselesse in Physick) as may be justly applicable to our present purpose: *Ceterum* (saith he, speaking of the *Bezoar-stone*) *quantum ad hyperbolicas hujus lapidis virtutes & facultates portentosas*

non

*non tantas in eo mille experientis edoctus inveni: And else-
where speaking of those contemptible and excrementitious
Stones that are found in humane Bladders: Nil porro (saith
he) de his lapidibus addo, ne videar eos elevare, & lithotomos
monere ut vel cum periculo plures mortales secent. Hoc certe
compertum habeo, lapidem in vesica hominis repertum, urinam
& sudores probè ciere quod tempore ingentis illius pestis qua
Anno 1624 & 1625. Leydam patriam meam & reliquas Hol-
landia Civitates miserandum in modum vastabat, in penuria
lapidis Bezoartici nos exhibuisse memini, & sudorificum (ausim
dicere) melius & excellentius invenisse, &c.*

*Idem cap. 46.
Gastia ab
Oria.*

Soot is generally looked upon as so vile a thing, that we
are fain to hire Men to carry it away; and yet, as I elsewhere
shew that it is a Body of no ignoble Nature, so I must here
tell you, that it is no unusefull one in Physick. And not to
mention that *Riverius* commends it crude, to the quantity of
a Drachme, in Plurisies: I have tryed, with the Spirit of it
well drawn, some things, that make me look upon it as a
considerable Liquor. And I know by their own confessions,
that some Medicines, even of eminent Physicians, that passe
under other Names, have the Spirit of Soot for their prin-
cipall Ingredient. I knew, a not unlearned Emperick, who
was exceedingly cryed up for the Cures he did, especially in
difficult Distempers of the Brain, by a certain Remedy,
which he called sometimes his *Aurum Potabile*, and some-
times his *Panacea*; and having obtained from this Man, in ex-
change of a Chymical Secret of mine he was greedy of, the
way of making this so celebrated Medicine, I found that the
main thing in it was the Spirit of Soot, drawn after a some-
what unusual, but not excellent manner; in which Spirit,
Flowers of *Sulphur* were, by a certain way, brought to be
dissolved, and swim in little drops that looked of a golden co-
lour.

*Medicines out
of Soot.*

The use of
Horfe-dung.

An Arcanum
of Ivy berries.

You will easily grant, *Pyrophilus*, that there are not any Medicines to be taken into the Body, more cheap and contemptible than the Excrements of Men and Horses, and than Insects: And yet that even these want not considerable Medical Vertues, we elsewhere shew. And (not to meddle with such nasty things as the grosser sort of humane Excrements, though they, outwardly applyed, either in Powder or otherwise, do sometimes perform strange things) the Juice of Horfe-dung, especially of Stone-horses, being strongly expressed (after the Dung hath been a while steeped in Ale, or some other convenient Liquor, to facilitate the obtaining the Juice, and to afford it a *Vehicle*) doth oftentimes so powerfully relieve those that are troubled with the stoppage of Urine, with Wind, Stitches, and even with Obstructions of the Spleen and Liver, that You, *Pyrophilus*, and I know a great Lady, who though very neat, and very curious of her Health, and wont to have the attendance of the skilfullest Physicians, scruples not, upon occasion, to use as I have known her do, in Silver Vessels, this homely Remedy, and prefer it to divers rich Cordials, and even to what some Chymists are pleased to call *Essences* or *Elixirs*: And with the same Remedy very many poor people were cured of the Plague it self, when it lately swept away so many thousands in *Ireland* (and the Doctors with the Patients, as I was assured by a Person who cured so many) as to invite men to secure themselves that assistance, by refusing the Party the liberty to leave the Town. But (to adde that upon the By) this Person, in exchange of a Secret of mine, confessed to me, That the *Arcanum*, which had cured such numbers, and to which the Juice of Horfe dung was a *Succedaneum*, was only a good Dose of the Powder of fully ripe Ivy-berries, which did usually, as also the Horfe-dung, work plentifully
by

by Sweat, and which I presently remembred to be one of those few things that *Helmont* commends against the Plague.

The Medical Vertues of Man's Urine, both inwardly given, and outwardly applyed, would require rather a whole Book, then a part of an Essay to enumerate and insist on: But referring you to what an industrious Chymist hath already collected touching that subject, I shall now only adde, That I knew an ancient Gentlewoman, who being almost hopelesse to recover of divers Chronical Distempers (and some too of these abstruse enough) was at length advised, instead of more costly Physick, to make her Morning-draughts of her own Water; by the use of which she strangely recovered, and is, for ought I know, still well. And the same Remedy is not disdained by a Person of great Quality and Beauty, that You know, and that too, after she had travelled as far as the Spaw for Her healths sake. And I remember on this occasion, that passing once through one of the remoter Parts of *England*, I was visited by an Emperick, a well-wisher to Chymistry, but a Novice in it, who pressing me to communicate to him some easie and cheap Preparation, that he might make use of among the Countrey People: I directed him to Distil, with a gentle heat, a Spirit out of Urine, putrified for six or seven Weeks on a Dung-hill, or some analogous heat, but in well clos'd Glasses, or other glazed Vessels; and having rectified this Spirit once or twice, that it might be rich in volatile Salt, to give ten, twenty, or thirty drops of it in any convenient Liquor for the Plurisie, for most kind of Coughs, and divers other Distempers, as a *Succedaneum* to the Essence of Harts-horn: And a while after this Emperick returned me great thanks for what I had taught him: and I found by him and others, that he had cured

Medicines
out of Mans
Urine.

cured so many with it, especially of Plurifies (a Disease frequent and dangerous enough in that Country) that this slight and seemingly despicable Remedy had already made him be cryed up for a Doctor, and was like to help him to a comfortable Subsistence.

Great store of healthy Mens Blood is wont to be thrown away, as altogether uselesse, by Chirurgions and Barbers, that let Men Blood (as is usual in the Spring and Fall) for prevention of Diseases; and yet from a Mans Blood skillfully prepared, though without addition of any thing, save Spirit of Wine to keep it at first from putrifying, may be easily obtained a Spirit, and volatile Salt, that have much the same Vertues, with those of the newly mentioned Spirit of Urine, but more noble (as far as I can guesse) then either that, or even Spirit of Harts-horn, as having performed in Consumptions, Asthma's, and other obstinate cases, such things as I, as well as others, could not but admire. But in this place, mentioning humane Blood only *in transitu*, I shall pretermitt what I have observed about the preparation of it; yet leaving you a liberty to call for my Observations upon a Medicine, which is perhaps nobler, than the most costly and elaborate Chymical Remedies that are wont to be sold in Shops, and which hath been almost alone excepted out of the Censure made by a Learned Modern Writer, of the Medicines found out by Chymistry.

I shall adde but one Instance more, of the efficacy that may be found in the most obvious and abject Creatures; and this Instance is afforded me, by those vile Insects commonly called in English, Wood-lice, or Sows, and in Latine *Millepedes*, which I have often both recommended to others, and taken my self: What their Vertue is against the Stone, the World hath been informed by *Laurembergius*, who

Medicines out
of Blood,

The great
Effects of
Millepedes in
the Stone.

who hath published a narrative, how by the use of them he was cured, even of the Stone in the Bladder, and he was invited to use them by credible information, that others had been cured of that Disease, by the same Remedy. And of late Years in *England*, an Emperick being much resorted to, for the relief he gave in that tormenting Sicknes, a Physician, famous for his Learned Writings, wondring at what was done, was very curious (as himself afterwards told me) to find out the Emperick's Secret, and at length was so industrious as to discover, That 'twas a slight preparation of *Millepedes*. But my having found them in my self very diuretical and aperitive, is not that which chiefly recommends them to me, For I knew, and lived in the same House with a pious Gentlewoman, much better skill'd in Physick, than her Sex promised, who having lost the use of one Eye by a Cataract, and being threatned by the Oculists with the speedy loss of the other, especially in regard of her being very aged and corpulent, she neverthelesse did, for some Years, to my wonder, employ her Eye to read and work with, without finding, as she told me, any decay in it, or any encreasing danger of a Suffusion: And she assured me, that her Medicine was to bruise first five *Millepedes*, then ten, then fifteen, then twenty, &c. (daily encreasing the number by five, till it had reach'd, if I mistake not fifty or sixty) in White-Wine (or Small-Ale) and to drink upon an empty Stomach, the strongly express'd Liquor; and when I desired to know how she came by this Specifick, she answered me, That having made enquiries among all those, both Oculists and others, that she thought might assist her against so sad a Distemper, she was advis'd to the use of *Millepedes*, by a Woman, that not only much magnified their virtue in such cases as hers, but assured her (if I much mis-remember not) that she her self

had

In suffusions of
the Eyes.

had been cured by them, of no lesse than an incipient suffusion in one or both of her Eyes.

And reall Cataracts,

[Since the writing of the former part of this Page, relating what I newly told you to a very Ingenious Physician, he assures mee, That being some Yeares since in *Holland*, he there met with a Woman who was cured, as her selfe confessed to him, of a reall Cataract, by the Juice of *Millepedes*, beginning with that of three at a time, and so encreasing to nine at once, and then gradually lessening the Dose by one Insect each day, till she were come back to three at a time; after which, she gradually encreased the Dose as before: And he addes, That this Woman was advised to this Medicine by an Emperick, that was said to have performed divers Cures with the same Medicine.]

In sore Breasts and Fistula's,

[What strange things these same *Millepedes* have done in the sore, and even exulcerated, Breasts of Women (provided they be not cancrus) though they be given without preparation onely to the number of three at first, and so on to nine at once (which number may perhaps by usefully encreased) stamp'd with a little White-wine or Beer, that the Liquor strain'd out may be drunk in a draught of Beer, Morning and Evening; during with time, Linnen cloathes dipped in White-Wine, and applyed warme, are to be kept upon the Breast, I may elsewhere have a fitter opportunity to relate. I shall now onely subjoyne, as a further prooffe of the great Virtue that may be even in vile and costlesse Insects, and that without any elaborate or Chymicall preparation, this memorable Story, That after all the tryals I had made about these *Millepedes*, I met with a young Lady, who by divers strangely winding and obstinate *Fistula's*, that had made themselves Orifices in many places of her Body, was not onely lam'd, but so consum'd and weakned, that she was scarce able to turne her

her self in her bed; and this, notwithstanding the utmost endeavours of the eminentest Chirurgions, both English and Foreigners, that could be procured: But when both the hopes of her Friends, and those that endeavour'd to cure her, were lost, she was in a short time not only freed from her *Fistula's*, but recovered to a thriving condition of Body, by the frequent use of an internal Medicine, which as both her Parents and the Person that taught it them informed me, was only a Drink (to be taken twice or thrice a day) made of a small proportion of a couple of Herbs (very common, and not much more likely to do Wonders in this case, than Wormwood and Mint) and of Three hundred of these *Millepedes* well beaten (when their Heads are pull'd off) in a Mortar, and tunnd up with the Herbs, and suspended in four Gallons of Small-Ale, during its fermentation. The wonderful efficacy of this Medicine in this and many other cases, which by occasion of this Cure were related to me, being almost wholly ascrib'd to the *Millepedes*, by the Illustrious Imparter of it, whose leave I have not yet, by naming him, to disclose, that this is the Secret He makes use of. _

CHAP. VI.

ANother way there is whereby the Naturalist may assist the Physician to make the *Therapeutical* part of Physick less chargeable, and that is, by shewing those that are wont to employ most Chymical Remedies, that much of the cost and labour in many cases might be spared. I am not altogether of their mind, that indiscriminately cry down Chymical Preparations as excessively dear: For of many of those that seem very dear, when bought by the Pound or the Ounce, a Dose may be cheap enough; as if for instance, an Ounce of precipitate

That the Naturalist discovers how much of the cost and labour in making many Chymical Remedies may be spared.

A comparison
of Chymical
Remedies with
Galenical ones
in point of
cheapness.

pitrate of Gold, and *Mercury*, cost ten times its weigh of Silver, under which rate I have bought it of honest Men, that make it themselves, yet that Ounce containing 480 Grains, (of which three or four may be a Dose) a taking of this dear Powder, may cost far less than a Dose of many *Galenical* Medicines, where the quantity that is taken at once, makes up what is wanting in the costliness of the Ingredients. But though this be the case of *some* Chymical Remedies, yet we must not deny, that *many* others are chargeable, and though perhaps not more so than many *Galenical* ones employ'd for the same purposes: Yet if those be dearer than they need be, that grievance ought to be redressed in Chymical Medicines, how justly soever the same thing may be imputed to *Galenical* ones.

Now there are two particulars, wherein the Chymists, and those Physicians that intimate them, are wont to be blameable in reference to this matter; The one, their employing Chymical Preparations on all occasions, even where Simples or slight Compositions might serve the turn: and the other is, Their making many of their Preparations more laborious, and consequently more chargeable than needs.

Of the use and
commendation
of Simples, even
by the most able
Chymists.

As for the first of these: 'Tis known there are divers Chymists, and others that practise Physick, who so dote upon the Productions of their Furnaces, that they will scarce go about to cure a cut Finger, with less than some *Spagyricall* Oyl of Balsam: And in slight Distempers have recourse to Chymical, and perhaps to Mineral Remedies, which being, for the most part, such as vehemently alter the Body, especially by heating and drying it, they do often more harm than good, when employed in cases that need not such active Medicines. And methinks those that practise, as if Nature presented us nothing worth the accepting, unless it be cook'd
and

And perfected by *Vulcan*, might consider, That *Paracelsus* himself oftentimes employeth Simples for the cure even of formidable Diseases. And though for particular Reasons I be inclinable enough to think, that such searching and commanding Remedies, as may be so much of kin to the Universal Medicine, as to cure great numbers of differing Diseases, will be hardly obtained without the help of Chymical Preparations, and those perhaps of Minerals : Yet as to most particular Diseases, especially when not yet arriv'd to a deplorable height, I am apt to think, that either Simples, or cheap or unelaborate *Galenical* Mixtures, may furnish us with Specificks, that may perform much more than Chymists are wont to think, and possibly be preferable to many of their costly *Magisteries*, *Quint essences*, and *Elixirs*. *Helmont* himself, a Person more knowing and experienced in his Art, than almost any of the Chymists, scruples not to make this ingenious Confession : *Credo* (saith he) *simplicia in sua simplicitate esse sufficientia pro sanatione omnium morborum* : And elsewhere he truly affirms, That there may be sometimes greater Virtue in a Simple, such as Nature affords it us, than in any thing that the Fire can separate from it. And certainly the Specifick Properties of divers, if not most Simples; are confounded and lost by those Preparations, wherein that Texture, which is the Foundation of those Properties, is either destroyed by the Fire, or changed by the taking away of some of the Parts; or the adding of some other Substance to it, with which compounded, it may constitute a new thing. The more Judicious of the Chymists themselves do several of them now acknowledge, that the bare reducing of Pearls to fine Powder, affords a Medicine much richer in the Virtues of the Pearles, than the *Magistry*, prepared by dissolving them in acid Spirits, and precipitating them with Oyle of

Helmont. Pharmac. & D. spiritus. Nov. p. 458.

Powder of Pearl more operative than *Magistry*.

So crude Harts-
horn, then
Magistery.

An excellent
simple medicine
to stanch blood.

Another like
Medicine for
spitting and vo-
miting of blood.

of *Tartar*, and afterwards scrupulously edulcorating them. And one may easily observe, that by making the *Magistery* of Harts-horn the same way, the Virtues seem to be more locked up than they were in the crude Horn, which may easily enough impart its Virtue in the Body, since fair Water will reduce a good part of it into a Jelly; whereas the *Magistery* remains a fixed Powder not easily dissoluble, even in acid *Menstruums*; and, which thrown upon hot Iron, will scarce send forth that stinking Smoak, which argues the avolation of the saline and sulphureous Parts. I never knew any of the vulgar Chymists *Essences* or *Elixirs* half so powerful a Remedy to stanch Blood, as a slight Mixture of two Drachms of *Hysciamum*, or Henbane-seed, and the like weight of white Poppey-seeds, beaten up with an Ounce of Conserve of Red-Roses, into a stiffe Electuary; with which, given, in the quantity of a Nutmeg, or Wall-nut, I have snatched some, as it were, out of the Jaws of Death; and with which an eminent Physician, now dead, affirm'd, That he, and the Inventor of the Remedy, had very frequently cured profuse bleedings at the Nose; and, in Women, at other Parts besides. Nor did I ever see, to give an instance in a resembling Disease, such wonderful Effects against spitting and vomiting of Blood, of the most elaborate Chymical Preparations, as I have of a slight Syrrup, made onely of a convenient quantity of fine Sugar, and the strongly expressed Juice of twelve handfuls of Plantine leaves, and six Ounces of fresh Cumfrey-roots, well beaten together; with which Syrrup, besides what I have tryed my self, two eminent Physicians performed in that Disease unusual Cures, though (for reasons elsewhere mentioned) I forbear to name them, otherwise than by telling you, That one of them is that ingenious an Friendly Dr. T. C. to whose skill both you and I owe so much.

But

But I consider further, that as oftentimes those I am reasoning with make use of Chymical Remedies, when much more easily parable ones may suffice; so in divers cases, where Spagyric Medicines are proper enough, their Preparations of them are more tedious and expensive than is necessary. There are more than a few who seldom prescribe, and seldom esteem a Chymical Process, that is to be perfected in less than many Weeks, as if a Chymical Medicine like an *Embryo*, must needs be an Abortive, if it be produc'd in less than so many Moneths. And, as if in Preparations, the Virtue depended less on the skilfulness, than the elaborateness, they seem to estimate the efficacy of Remedies by the time and pains requisite to prepare them, and dare not think, that a Medicine can quickly cure, that was not long a making; as indeed theirs (especially those where Cohobations and Digestions, till they have such and such effects upon the Matter to be wrought on by them, are prescrib'd) are many of them far more toilsome and tedious, than those that have but read such Processes, without working them, are apt to suspect. And this is the humour of divers, not only as to those stable Medicines, that ought always to be found ready in Apothecaries Shops, but even as to those that are design'd for particular cases, and perhaps acute Diseases; in which Emergencies, if a Physician had no other Remedies than those he must make according to such Processes, it would, I fear, too often happen, that before the Medicine could be ready, the Patient would either be past the need of it, or past the help of it. And that which oftentimes encreaseth the tediousness of Chymical Processes, is the unskilful Prescriptions of those that devise them. 'Tis not unusual in Chymists Writings to meet with Processes, wherein the Matter to be prepared, is expos'd to I know not how many
several

severall successive Operations : But if you should aske, Why such a thing should be, for instance, rather precipitated, than exhal'd *ad siccitatem*; or why such or such an Operation is to be used after such another, rather than before it; nay, perhaps, if one should demand why some of those Operations should be used at all, the Devisers of those unskillfull Processes would possibly assoone be able to finish their operations, as to give a satisfactory answer. Nay, sometimes they lengthen their Processes by Operations, so injudiciously prescrib'd, that they crosse one another; And the Chymist vexeth himselfe, and the matter he workes upon, to leave it at last no better, if not a worse, Medicine than he found it; of this we have already given an instance in the common *Magistries*.

That many times Chymists by their tedious & injudicious preparations, alter the Medicine and make it worse,

But I lately met with another Example of it, in the Writings of a Famous, Moderne Chymist; where, to purifie the fixed Salt of Vegetables, to the height, after I know not how many Solutions, Filtrations and Coagulations (which alone would abundantly serve the turne) he prescribes the dissolving them in *Aqua fortis*; after which, he saith, they will become very pure and chrySTALLINE, and not so easily resolvable in the Aire: Of which I make no doubt, for divers Yeares before I met with his Processe, I have, with the fix'd Salts of more than one kinde of Vegetable, by joyning them with *Aqua fortis*, and after a while exhaling the superfluous moysture, made good inflammable *Salt Peter*; by which you may easily guesse, how judiciously the solution in *Aqua fortis* is prescrib'd onely as a further depuration; and how fit such Authors are to be credited, when they ascribe to these ChrySTALLINE Salts the severall Virtues (and those improved too) of the respective Vegetables, from which the *Alcalies* were obtained. And indeed, as to those exact Depurations, which some Chymists
so

So the dissolving the Salts of Vegetables in *Aqua fortis* to make them pure and ChrySTALLINE, alters their Virtues, and makes them inflammable as *Salt Peter*.

so strictly require in all their Preparations, though their Processes be oftentimes hereby made incredibly tedious, I will willingly allow, nay assert, that in some cases, and especially in the making of powerfull *Menstruums*, which by their activeness and penetrancy, are to unlock other Bodies, Chymists do rather erre in making their Depurations lesse exquisite then they should, then on the other hand: Yet in many other cases, such exact refining and subtiliation of a Remedy, is not so necessary as they imagine; and sometimes too, may do more harm then good, by sequestering those parts of a Simple, as *faces*, which concurred with the finer parts to that determinate Texture, whereon the Specifick Virtues of it did principally depend; but of this more, elsewhere. And therefore I shall here present you with two or three Instances, to shew you, That Remedies, at least as noble as such vulgar Chymical ones as are more tedious and costly, may be prepared in a shorter time, and cheap enough to be fit for the use of the Poor.

And to comply, *Pyrophilus*, with your curiosity, to know the preparations of those Chymical Medicines, that I do the most familiarly employ, the three following instances shall be of such, namely, The *Flores Colchotaris*, The *Balsamum sulphuris crassum*, and The *Essentia Cornu cervini*, that you may see what slight and easie preparations afford the Remedies, whose Effects you have so often heard of, if not also seen.

The first of these, is the same Powder, which passeth under the name of *Ens Veneris*, which appellation we gave it not out of a belief, that it equals the Virtues ascribed by *Helmont*, to what he calls the true *Ignis Veneris*, but partly to disguise it a little, and partly upon the account of the occasion whereon it was first found out, which was, That an

Industrious Chymists (whom you know) and I, chancing to look together upon that Tract of *Helmonts*, which he calls *Butler*, and to compare it somewhat attentively with other passages of the same Author, we both resolved to try, Whether a Medicine, somewhat approaching to that he made in imitation of *Butler's Stone*, might not be easily made out of calcined Vitriol; And, though upon tryals we found this Medicine far short of what *Helmont* ascribes to his, yet finding it no ordinary one, we did, for the Minerals sake it is made of, call it *Ens primum Veneris*.

The Preparation
and Virtues
of *Ens Veneris*.

The Preparation, in short, is this: Take good *Dantzick* Vitriol (if you cannot get *Hungarian* or *Gossarian*) and calcine it till the *calx* have attained a dark red, or purplish colour; then, by the frequent affusion of boiling, or at least warm Water, dulcifie it exactly, and having freed it as well as you can from the saline parts, dry it thoroughly, and after mix it exquisitely, by grinding, or otherwise, with an equal weight of pure *Sal Armoniack*, very finely powdered, Put this Mixture into a glass Retort, that may be but a third part filled with it, and subliming it in a sand-Furnace, by degrees of Fire, for ten or twelve hours, towards the latter end encreasing the Fire, till the bottom of the Retort (if you can) be brought to be red hot: That which is sublim'd must be taken out, and if it be not of a good yellow, but pale (which usually happens for want of an exact commision of the Ingredients) it may be returned to the residue, mingled better with it again, and sublimed once more: The yellow, or reddish Sublimate may be sublim'd a second time, not from the *Caput Mortuum*, but by it self, but if you re-sublime it oftener, you may, though you will think that strange, impair the Colour and the Sublimate, instead of improving them. The Dose is from two or three Grains, to ten or twelve (in some Bodies

Bodies it may be encreased to twenty or thirty, without danger) in distill'd Water, or small Beer, or other convenient Vehicles: It may be given at any time upon an empty Stomach, but I most commonly give at Bed-time. It works, when it works sensibly, by Sweat and somewhat by Urine. That it is a potent Specifick for the Rickets, I think I scarce need tell *Tou, Pyroph.* whose excellent Mother and Aunt, together with some Physicians, to whom I also gave it ready prepared, have cured perhaps a hundred, or more Children, of that disease, divers of whom were looked upon as in a desparate condition. I give it also in Feavers, and other Distempers, to procure sleep, which it usually doth where it is wanting: In the Head-ache likewise, in which, if the Disease be inveterate, the Remedy must be long continued; with the like admonition it hath done Wonders, *in suppressione Mensium obstinata*: In the Worms it hath sometimes done strange things; and for provoking of Appetite, I remember not that I have either taken or given it without successe: And though I seldome take (for I often give more) above two or three Grains of it at a time, yet in that small Dose it usually proves Diaphoretical to me the next Morning.

But the Experiments we have had of the several Virtues and Efficacy of this Medicine, would be here too tedious to recite: and therefore I shall now pass them by, though, if you require it, I shall not be backward to set you down, by way of Observations, most of the cases wherein I or my Friends have given it, and of the principal Cures that have been performed by it: In the mean time, because this exalted *Colcothar*, being given in so small a Dose, may prove, if it be rightly and dexterously prepared, what *Helmont* saith of his imitation of *Bulsters Drif*, a Medicine for the Poor, and yet

yet requires more care, not to say skill, to prepare it well, than the bare reading of the Proceſſe you will imagine; I ſhall, to gratifie your Charity, annex to the end of this Eſſay, (for to inſert them here would make too prolix a Digreſſion) as many of the particulars relating to the preparation of it, as I can readily meet with among my looſe Notes. At leaſt you ſhould thinke mee a Mountebanke for want of knowing in what ſenſe it is that I commend this and the other particular Medicines: I ſhall likewise to thoſe Obſervations ſubjoyne a Declaration of my meaning in ſuch particulars, and of the ſenſe, wherein I deſire you ſhould underſtand what you meet with in the Praise of Remedies either in this Eſſay or any other of my Writings, which I hope it will be ſufficient to give you this Adverſement of once for all.

The next Medicine I am to mention to you is the *Balsamum Sulphuris*, which being made but with groſſe Oyles drawn by Expreſſion may be called *Craſſum*, to diſtinguiſh it from the common and thinner Balſome of Sulphur, that is made with the Diſtilled Oyle or Spirit of Turpentine.

The Preparation
and Virtues
of the *Balsamum
Sulphuris
Craſſum*.

This Balſome is made in an houre or leſſe, without a Furnace, onely by taking to one part of good Flower of Brimſtone, foure or five times as much (in weight) of good expreſſed Oyle, either of Olives, or Nuts, or Poppey-ſeeds, and boyling the former in the latter in a Pipkin halfe filled with both, till it be perfectly Diſſolved into a Blood-red Balſome. But as eaſie as this Preparation ſeems (and indeed is) to them that have often made it, it will not at firſt be ſo eaſie to make it right; For the Fire, which ought to be of well kindled Coales, muſt be kept pretty quick, and yet not over-quick, leſt the Oyle boyle over, or do not well Diſſolve the Flowers of *Sulphur*, but turne them with its ſelfe into a Clotted and almoſt Liver-coloured Maſſe: And to avoid

avoid these inconveniencies, and the aduſion of the Matter, ſpecial care muſt be had to keep it conſtantly ſtirring, not only whil'ſt the Pot is over the Fire, but after it is taken off, till it be quite Cold. You may, if you think fit, Diſſolve this ſimple Baſom in Chymical Oyle of Anny-ſeeds, or any other Eſſential Oyle, like to advance its Efficacy in this or that particular Diſtemper: But thoſe Oyles being generally very hot, I moſt commonly preſcribe the Baſom without thoſe Additions, eſpecially if long Diſteſtion have ſomewhat leſſened the Offeſſivenelle of the ſmell, which though no peculiar fault of this Preparation being common to Sulphureous Medicines, is yet the chief inconvenience of it. I will not too reſolutely affirm that this is the very *Baſamum Sulphuris Rulandi*, of which that Author relates ſuch wonderful things in his Centuries; but if it be not the ſame, it is ſo like it, and ſo good, that I doubt not but by peruſing thoſe Centuries, you may find divers uſes of it, that I have not made tryal of: And in Coughs, old Strains, Bruiſes, Aches, (and ſometimes the ſupient fits of the Gout it ſelfe) and eſpecially Tumors, ſome of your Friends can inform you, that it doth much greater things than moſt Men would expect from ſo ſlight and eaſie a Preparation; And indeed greater than I have ſeen done by very coſtly and commended Baſoms and Oyntments, ſold in Apothecaries Shops; And in thoſe Obſervations, I lately told you, you might command, you will find that this Baſom outwardly applyed, hath cured ſuch obſtinate Tumours, as Men either knew not what to make of, or what to do with them, of which ſkilful Phyſicians, to whom I gave it to make tryal of in difficult caſes, can bear me witneſſe; Though it oughe ſufficiently to endear this Baſam to us both, that it was the Means of reſcuing your Fair and Virtuous Siſter F. from

a dangerous Consumption. In outward Application it is to be well warmed, and to be chafed into the part affected, which should be afterwards kept very warme, or else Lint dipped in it may be kept upon the place. Inwardly some drops of it may be given at any time, when the Stomach is not full; either rolled up with Sugar, or mingled with any convenient Vehicle, But as for the Particulars that concerne the Preparation of this Balsome, you will finde, those I can readily meet with among my loose papers, annexed, with the Notes concerning *Ens Veneris*, to the end of this Essay.

The Preparati-
on and Virtues
of Essence of
Harts-horne.

And therefore I shall now proceed to mention the third Medicine, which you have often heard of, under the name of *Essence of Harts-Horne*: but which is indeed onely the Simple, but well Purified and Dephlegmed Spirit of it. And though Men are pleased to imagine, by the Effects this Remedy often produces, that I have some Mysterious or elaborate way of preparing it, yet to deale ingenuously with you, the chiefe thing I have done to bring it into credit, is the teaching some Physicians and Apothecaries a safe and easie way of making it: For whereas before, those that went about to Distill it, commonly used, as the Apothecaries are wont to do in what they make of the same Matter, Shavings or Raspings of Harts-horne, and distilled it with a strong and naked Fire, the fugitive and subtile Spirits were wont to come over in that plenty, and with that impetuosity, as to breake the Glasses to pieces, whereby Apothecaries, and even Chymists were discouraged from drawing the Spirit, and they not having it in their Shops, Its Virtues remained unknowne. Whereupon, considering that if it were onely broken on an Anvill into pieces of about the bignesse of ones little finger; Besides that this way of comminution would

would be far less chargeable than Rasping, the fumes would not be driven out so fast: and considering too, that a violent Fire was requisite, not to distill the subtle Spirit, but to drive over the grosse and heavy Oyle; I thought it was needlesse to take pains to force that over, which not being (that I observed) used in Physick, would cost me further pains to separate it again: And therefore, trying to Distill Harts-Horn, in naked Retorts, placed but in Sand, I found I could Distill two or three pound at a time, and obtain from each of them, almost, if not quite, all the Spirits and volatile Salt, which I afterwards separated from the reddish and lighter Oyl, and freed them from Phlegm and Feculencies by a couple of Rectifications, made in tall Glasses, and with very gentle heats: (commonly of a Lamp Furnace) The Dose may be from eight, or ten Drops of the Spirit, or Grains of the Salt, to sixtimes the quantity of either, in warm Beer, or any Vehicle that is not acid, except Milk. Finding it to be a Medicine of an attenuating, resolving, and Diaphoretical Nature, and one that much resists Malignity, Putrefaction, and acid Humors (whence being mingled with Spirit of Vinegar, and the like sour Juices, it destroys their acidity.) I direct it (*Praescriptio Universalibus*) in Feavers, Coughs, Plurisies, Obstructions of the Spleen, Liver, or Womb, and principally in Affections of the Brain, as Stoppages of the Head Feaverish *Deliriums*, and even in *Phrenetide*. And, since I wrote a good part of this Essay, I had an Experiment of it in a Child, who being, by many violent Convulsion-fits, reduced to a desparate condition, was recovered by one Dose of five or six Drops of this Spirit, that I sent it. It is true that I have another Medicine, that is more elaborate and costly, and more properly bears the name of *Essentia cornu cervi*, which I
more

more value than this : But I cannot communicate that ; without prejudicing a third Person , and an excellent Chymist who makes a great advantage of it . But this I can tell you, that most of the Cures ; for which my Preparation of Harts-horn hath had the good fortune to be esteemed , have been performed with the above-described Simple Spirit and Salt , with which some skilful Physicians and other ingenious Persons , who had it from me, have within these few Years saved so many Lives , that I am enclined to think , I have done no useles piece of Service , in bringing so happy a Medicine into Request , especially with those that have skill and opportunity to make better use of it than I . But, *Pyrophilus* , I find I have detained you so long with so prolix a Mention, of the three above-described Remedies, that I should think it requisite , to make you a solemn Apology : but that I hope your Charity will as well invite you to Pardon the fault, as mine induced me to commit it.

CHAP. VII.

That Mechanicks and other Experimental Learning may teach how to lessen the charge of cures, by making more convenient furnaces, demonstrated in diverse particulars.

A Fourth way of lessening the Charges of Cures , may be this ; That whereas the dearth of very many Medicines proceeds from the Chargeableness of those Chymical Operations, whereby they are wont to be prepared , it is to be hoped that a greater measure of skill in Physiology , and other Experimental Learning, will suggest cheaper and better wayes of doing many things in Chymistry , than are, as yet, usually practised.

And those thrifty Expedients, I conceive, may be of several kinds, of which I shall at present mention, and that but transiently, three or four.

And

And first, I doubt not but Chymists may be taught to make better Furnaces, for several purposes, then those that have been hitherto most used among them: For professed Chymists, having been for the most part unacquainted enough with many other parts of Learning, and particularly with the Mechanicks their contrivances of Furnaces and Vessels, have been far enough from being as good, as knowledge in Mechanicks and dexterity in contrivances might, and, I doubt not, hereafter will, supply them with: whether as to the saving of Fuel, or to the making the utmost use of the Heat afforded by the Fuel they do employ, or as to the intending heat to the height, or as to the regulating of heat at pleasure.

It is somewhat wonderfull, as well as pleasant, to see how many Vessels may be duly heated by one Fire (perhaps no greater then common distillers employ to heat one Vessel) if the Furnace be so contrived, as that the Flame may be forced to passe in very crooked and winding Channels, towards the Vent or Vents, and the heat may be skilfully conveyed to the several parts of the Furnace, according to the Exigency of the work it is to do: And as for the intention of heat, I remember I have had odd effects of it, by the contrivance of a certain Furnace, that held but very few Coales, and to which I used no Bellows. But though by this way I could vitrifie sometimes the very Crucibles, and thought possibly I could, with a slight alteration, melt down the sides of the Furnace themselves; yet a Disciple of *Cornelius Drebell*, and a very credible Person assured me, That he knew a way of Furnaces that was yet fitter to bring heat to the *superlative* Degree; and that he himself, the Relator, could by the meer force of Fire in his Furnace, bring *Venetian Calk* to flow; which is more, I confesse then ever I have been able

to do either in mine, or those of the Glas-house. But Experience hath assured me, it is easie to make a Furnace give that heat as expeditiously enough, and in other respects very conveniently to *Cupel* both Gold and Silver, without the least help of Bellows: That also Furnaces may be so ordered, as that the heat may be better regulated, then That in our ordinary ones, I may elsewhere shew you cause to believe: And in the mean time I shall only tell you, that I look upon the skill of intending and remitting heat at pleasure, and especially the being able to keep a gentle heat long and equal as a thing of much greater moment, both as to Physick and Philosophy, then Chymists are wont to think (the powerfull effects of constant and temperate heats, being as yet known to few save those that have made tryal of them) And with Lamp-Furnaces, well ordered, divers things may be done in imitation of nature; some friends of mine having, as several of them assure me, in such Furnaces brought Hens egges to manifest Animation. That also Furnaces may be so built, as to save much of the Laborants wonted attendance on them, may appear by the obvious invention of *Atharors* or Furnaces with Towers, wherein the Fire is for many Hours, (perhaps for twenty-four, or forty eight) supplied with a competent proportion of Coales, without being able to burn much faster then it should: And that in many cases the labour of Blowing may be well spared, and the annoyance of Mineral fumes in great part avoided, by an easie contrivance; is evident by those Furnaces which are blown by the help of a Pipe, drawing the Air, as they commonly speak, either at the top, as in *Glauber's* fourth Furnace, or at the bottom, or for want of room upwards, I have sometimes tryed: To which may be added, that the casting of the Matters to be prepared upon quick Coales, as *Glauber* prescribes

in that which he calls his first Furnace, is in some cases a cheap and expeditious way of preparing some Minerals, though his method of making Spirit of Salt in that Furnace would not succeed, according to his promise with me, and some of my acquaintance. And there are other more commodious Contrivances, by casting some things upon the naked Fire, which invites me to expect, That there will be several good Expedients of employing the Fire to Chymicall operations, that are not yet made use of, nor, perhaps, so much as dream'd of.

And as Furnaces, so the Vessels that more immediately contain the Thing to be prepared, are questionlesse capable of being made more durable, and of being better contrived, then commonly they are. Good use may be made of those Earthen Retorts, that are commonly called *Glauber's* second Furnaces, in case they be made of Earth that will well endure strong Fires; and in case there be a better way to keep in the Fumes, then that he proposes of melted Lead, which I have therefore often declined for another, as having found it lyable to such inconveniences as I elsewhere declare.

But for Materials that are cheap, and to be distilled in quantity, as Woods, Harts horn, &c. the way is not to be despised, and is, as we may elsewhere have occasion to shew, capable of improvement; though in many cases this kind of Vessel is inferiour to those tubulated Retorts, that were of old in use, and mentioned by *Basilius Valentinus*, and from which *Glauber* probably defam'd that which we have been speaking of. The utility of the way of sealing Glasses hermetically, and of the Invention that now begins to be in request of stopping the Bottles, that contain corrosive and subtil Liquors with Glasse-stopples, groun'd fit to their Necks, instead of Corks, together with some other things,

Glasse Stopples
fittest for Cor-
not sine Liquors.

not now to be mentioned, keep me that I scarce doubt but that if we could prevail with the Glasse-men, and the Potters, to make Vessels of Glasse and Earth exactly, according to directions, many things in Chymistry might be done better and cheaper than they now are; and some things may be then done, that with the forms of Vessels now in use cannot be done at all. And if that be true which we find related in *Pliny*, and with some other Circumstances in *Dion Cassius*, of a more ingenious than fortunate Man, who, about his time, was put to death for having made malleable Glasse: As the truth of that Story, if granted, would shew the retrieving that Invention, a thing not to be despaired of: So he that could, now Chymistry is so cultivated, find again the way of making Glasse malleable, would be, in my Opinion, a very great Benefactor to Mankind, and would enable the *Virtuosi*, as well as the Chymists, to make severall Experiments, which at present are scarce practicable; and some Chymists would perhaps think the attempt more hopeful, if I tell them first, that I remember *Raymund Lully* expressly reckons it among three or four of the principal Virtues he ascribes to the Philosophers Stone, that it makes Glasse malleable; and then, that an expert Chymist, seriously affirmed to me, that he met with an *Adeptus*, who, among other strange things, shewed him a piece of Glasse, which the Relator found, would endure and yield to the Hammer: But what my own Opinion is concerning this matter, and what are the (uncommon) Inducements I have to be of it, I must not here declare.

And on this occasion, I remember I have seen an Instrument of Tin, or Pewter, for the drawing of Spirit of Wine (which you know is one of the chargeablest things that belong to Chymistry) so contrived, that whereas in the ordinary

nary way much time; and many rectifications are requisite to dephlegm Spirit of Wine; one distillation in this Vessel will bring it over from Wine it self, so pure and slegmlesse, as to burn all away. And I remember, that the ancient French Chymist, in whose Laboratory I first saw one of these Instruments, told me, That it was invented, not by any great Alchymist or Mathematician, but by a needy *Parisian* Chirurgion. And now I speak of Spirit of Wine, I shall adde, That as the charges of Chymistry would be very much lessened, if such ardent Spirits could be had in plenty, and cheap: so I think it not improbable, that in divers places there may be found, by Persons well skill'd in the Nature of Fermentation, other Vegetable Substances farre cheaper then Wine, from which an inflammable, and saline Sulphureous Spirit, of the like virtue, for dissolving resinous Bodies, drawing Tinctures, &c. may be copiously obtained: For not only, it is known, that Sydar, Perry, and other Juices of Fruits will afford such a Spirit: and that most Grains, not very unctuous, as Barley, Wheat, &c. will do the like; but other Berries that grow wild, as those of Elder, will yield a Vinous Liquor. And in the *Barbada's* they make a kind of Wine, even of Roots, (I mean their *Mobby*, which they make of Potato's; as I have also, for curiosity sake, made Bread of the same Roots:) nay, even from some sorts of Leaves, such a Liquor may be obtained: For I have observed Roses, well fermented, to yield a good Spirit very strongly-tasted, as well as inflammable. And as to the Preparing of pure Spirit of Wine it self, I know wayes (and one of them cheap) that may exceedingly shorten the time, and pains of dephlegming it: but, that being to be done otherwise, then by any peculiar contrivance of Furnaces or Glasses,

That inflammable Saline Sulphureous Spirits may be drawn from other Substances cheaper then Wine.

Glasses, I reserve it for a fitter place, in one of the following Essays.

Instances in divers particulars how the Naturalist may find cheaper wayes of Heating the Chymists Furnaces.

And as more expedient and thrifty wayes, then the vulgar ones, of making Chymical Furnaces and Vessels, may be devised: so it is to be hoped that a skilful Naturalist may find cheaper wayes of heating the Chymists Furnaces, or Distilling in his Vessels (either by finding combustible Materials, not formerly in use in the places where we work, or by making those already imployed fitter for use) by bringing them by some cheap alterations, either to give a greater, or a more durable heat; or to be lesse offensive by their smoak or smells; or else by discovering some cheap way of doing, in some cases, without Fire, what was wont to be done by it.

We see that in some places, especially here in *England*, where Char-coal was only burnt in Furnaces, Pit-coal is substituted in its roome: and at this Day there are several of those that make *Aqua fortis*, in great quantities, that Distill it with such Coals, which cost nothing neer so much as those made of Wood. And experience hath informed me, that even in other sorts of Furnaces, the same Fuel may be imployed, provided the Barres of the Grates be set wider asunder, and a little Char-coale be mingled with it for the better kindling; and since of late Years Pit-coal have been found in several places among us, where they were not formerly known to be, it seems not improbable, that many other Countries may afford Chymists, and the rest of their Inhabitants, the like advantage; if search were duely made, by boring of the ground, by the observations of the Waters, and the Sreams of places suspected, and by other wayes of inquiry that a skillfull man might direct. But because the abundant Smoak of Pit-coal, uses to be very offensive, and the

the smaller Coales easily run thorough the Grates; and because of other inconveniences, there hath been a way found out of charring these Coales, and thereby reducing them into coherent Masses, of a convenient bignesse and shape, and more dry and apt to kindle; And these, though quantity for quantity, their price be little inferiour to that of Char-coale; Yet those that consume great proportions of Coales, tell me they find them almost as cheap again, in regard they will not only last much longer, but give (especially near at hand) a farre more intense heat: And therefore it must be a very useful thing to Chymists, to shew a way of charring Sea-coales, without the help of those Pots, which make them of the price they now bear. And that it is not only possible, but very easie, I could quickly shew you, if it would not prejudice an industrious Laborant, whose profession being to make Chymical Medicines in quantity, obliges him to keep great and constant Fires, and did put him upon finding a way of charring Sea-coale, wherein it is, in about three hours or lesse, without Pots or Vessels, brought to Char-coale; of which having, for curiosity sake, made him take out some pieces, and cool them in my presence. I found them upon breaking to appear well charr'd, and much thereof in shew not unlike a Marchasite. And that which was very convenient in this Contrivance was, that whilst the Pit-coal was charring, it afforded him a very intense heat to melt or calcine the Minerals, he had occasion to expose to it: And he confest to me, that by this Method, he saved three parts in four of the Charges the keeping such great and constant Fires, with common Char-coal, would cost him. In *Holland*, likewise, they have a way of charring Peat, (which is a combustible Turfe, that they dig under Ground) and a skilful Distiller, that much employed it, commends it

Of Charring
Coals, so that
while it chars
it gives an in-
tense heat fit
to melt or cal-
cine Minerals.

Of Charring
Peat.

to

to me; as a very good Fuel, even for Chymicall Fires, which I therefore mention, because the way of charring Peat, is not yet brought into several Countries, where Peat is digged up: And probably, it would be found in divers Regions, where it is yet unknown, if due search were made for it. To which I may adde, that it is not unlike, that some Countries may afford such combustible Materials fit for Chymicall Furnaces, as have not, as yet, been so much as named by Mineralists: as I remember I have seen, and had, a sort of Coales, some of which looked like Marchasites, that burned clear with a good Flame, and had this convenient quality, for the Chymists use, that they were not apt, like the common Pit-coals, to stop the Grates with their Sindes, but burnt to whitish Ashes almost like Char-coale made of Wood; and yet gave so great a heat, that an Industrious Chymist of my acquaintance, who kept many things constantly at work, found it worth while to have them brought him, above a dayes journey, on Horses backs.

But it is not impossible, that when men grow better Naturalists, they may finde wayes, of exciting heat, enough for many Chymicall operations, without the help of Fire, and consequently, without the consumption of Fuel. We find that by the attrition of hard Bodies, considerable degrees of heat may be produced, not only, in combustible Materials, as Wood, and the like, (which would therefore be improper, to be here insisted on;) but in others also, and particularly in Iron and Steel, one may by attrition soon produce a smart heat, as you may quickly try, by nimble Filing a piece of Iron, with a rough File, or swiftly rubbing, though but for a few minutes, a thin piece of Steel against a Board. And whether some contrivance may not be found, by the help of cheap Engines moved by Water, or otherwise,

to

to produce a durable heat in Iron Vessels, fit to digest in, we may elsewhere have further occasion to consider; But this is known, that from some succulent Plants, a Liquor may be drawn, only by exposing them in Glasses, purposely contrived to the Beams of the Sun. And there is nothing more common, than for Chymists to make their Digestions by the warmth of Horse-dung, whereby they might also (as some Analogous tryals incline me to think) conveniently enough, Distill some fermented Liquors; especially, if the way were improved by the skilfull addition of Quick-lime, and seasonable aspersions of Water. And I doubt not but many cheap Materials might, by a few tryals, be found, whereby portable digesting Furnaces, without Fire, (if I may so call them) might be made, without the ill smell and nastiness, which discommends the use of Horse-dung. For not only we see, by what happens in the Spontaneous heating of Malt, and some other familiar substances, that probably most sort of Grains, and Berries, fit for Fermentation, may be brought to yield, for a good while, a heat great enough to putrifie, or digest with: But I have, severall Years agoe, by many tryals found; that I could, by invironing Glasses with reffuse-Hay; well pressed down and equally wetted throughout, produce for divers dayes such a heat, as made me decline the employing of Horse-dung; and yet (which is the chief thing for which I mention this) the quantity of Hay was so small, that in all my tryals I found not, that the Hay did of it self, though kept close enough, take Fire; as else is usuall in Ricks of Hay not sufficiently dried, where the quantity, and consequently the weight, that presses the lowermost parts close together, is considerable.

Of Digestion
and distillations
without
Fire.

But further, in divers operations, where an actual Fire is
y requisite,

requisite, it may be hoped that knowing Men, may discover wayes of saving much of the Fire, and making Skill perform a great part of the wonted office of Heat. To obtain the Spirit of fresh Urine, you must Distill away near nine parts of ten, which will be but Flegm, before the Spirit or Volatile Salt will (and that scarce, without a pretty strong heat) regularly rise. And there are several Chymists that, to this day, make use of no better way of Distilling Urine: But he that knows, how Putrefaction opens many Bodies, may easily save himselfe the expence of so much Fire: For if you let Urine stand well stopped, for eight or ten Weeks, the Saline and Spirituous parts will so extricate themselves, that the Spirits that before stayed behind the Flegme, will now, even with the gentlest heat, rise up first, and leave the Flegme behind. And on this occasion I shall teach you, what I doe not know to have been mentioned by any Writer; namely, That even of fresh Urine, without Digestion or Putrefaction, I can, by a very cheap and easie way, make a subtile and penetrant Spirit, ascend, first, even in a gentle heat; And I am wont to do it only by pouring Urine, how fresh soever, upon Quick-lime, till it swim some Fingers breadth above it, and then distilling it as soon as I please. But I did not find, upon many tryals, that this Spirit, though even without Rectification very strong and subtile, would Coagulate Spirit of Wine, like that of putrified and fermented Urine; though, perhaps, for divers other purposes it may be more powerfull.

And here I shall advertise You, that whereas I just now took notice, that there was a pretty strong Fire requisite to force up the Salt of unfermented Urine, out of that part, which, after the abstraction of the Flegme, remains of the consistence of Honey; tryal hath informed me, That the volatile

Wayes of distilling Spirit of Urine,

Of distilling it with Lime without fermentation,

* That to distill'd it doth not coagulate Spirit of Wine, as in the usual distillation.

latile Salt may out of the thick Liquor be obtained, better and more pure, with ease, and with a scarce credibly-small heat; barely, by tempering the Urinous Extract with a convenient quantity of good Wood Althes, whereby (for a reason elsewhere to be considered) the volatile part of the Salt of Urine, is so freed from the grosser Substance, that with strange facility it will ascend, fine and white, to the top of very tall Glasses. But of the differing Preparation of Urine, more perhaps elsewhere. I now proceed to tell you, that I think it not unlikely, that even Bodies, which are more grosse and sluggish, may by the affusion of such *Menstruums*, as humane Industry may find out, be farre more easily, either, volatiliz'd or unlockt, then common Chymists are wont to think. For I know a Liquor, not very rare among Chymists, by whose help I have, often enough, distill'd Spirit of Nitre, (whose distillation requires much about the same violence of Fire, with that of *Aqua-Fortis*) even in a moderate heat of Sand, and without a naked Fire. This Spirit may easily enough be brought over, even in a Head and Body: and, for a Wager, I could obtain a little of it without any Fire or outward heat at all. And I remember also, That having once digested a certain *Menstruum*, for a very short time, upon crude *Antimony*, and abstracted it, in a very gentle heat, of Sand; the Liquor, not only, brought over some of the *Antimony* in the form of red Flowers, swimming in it, and united other parts of the Mineral, with it self, in the transparent Liquor, but the gentle heat raised to the top of the Retort, divers little Masses of a substance, that were very transparent, like *Amber*, which were inflammable, and smelt, and burnt blew, just like common *Sulphur*; And yet the *Menstruum*, which was easily again recoverable from the *Antimony*, was no strong Corrosive, tasting,

Of the power
of good *Men-
struums* in faci-
litating distil-
lation.

before it was poured on, not much unlike good Vinegar.

That the calcination of Gold is facilitated by Amalgamations with *Mercury*.

But besides all the wayes above mentioned of saving the Chymist, either, Time, or Fire, or Labour: I despair not that divers others, yet unthought on, will be in time found out by the Industry of skilfull Men, taking notice of the nature of things, and applying them to Chymicall uses: as we see, that by Amalgamations with *Mercury*, the calcination of Gold, and Silver, may be much easier performed, than by a long violence of Fire. And, (if it be true, what *Helmont*, and *Paracelsus*, tell us of their immortall Liquor *Alkabeft*) Medicines farre nobler, and otherwise more difficult to make, than those hitherto in use among the Chymists, may be Prepared with greater ease, and expedition, and with far lesse expence of Fire, than the nature of the Mettals, and other Concretes to be opened by it, would let a vulgar Chymist suspect. However, I see no great cause to doubt that there may be *Menstruums* found that will much facilitate difficult Operations, since not to mention again the Liquor I lately told you would work such a change on Nitre (and, I might have added, on some other compact Bodies;) it is very like, there may be *Menstruums* found, that will not be so spoyled by a single Operation, made with them, as our vulgar saline Spirits are wont to be. For I have tryed that a *Menstruum*, made by the bare distillation of good Verdigrease, will not only draw, as I have formerly told you, a Tincture of Glasse of *Antimony*, or performe some other like Operation for once, but being drawn off from the dissolved body, or the Extraction, will again serve, more than once, for the like Operation upon fresh Materials.

The power of Verdigrease distilled in drawing tinctures of Glasse of *Antimony*, &c.

The fifth, and last way, *Pyrophilus*, that I intend to mention, of lessening Chymicall expences, is, That the Naturalists may probably find out wayes of preserving some Chymicall

mical Medicines, either longer or better than those wayes that are usual. But of this preservation of Bodies, being like, as I formerly intimated, to have elsewhere further occasion to Treat; I shall now only say, That the purified Juyces, liquid Extracts, *Robs*, and other soft Medicaments, made of Plants, may be Conserv'd far cheaper, as well as better, than with Sugar (which clogs most Mens Stomacks, and otherwise disagrees with many Constitutions (in case *Helmont* say true, where he tells us, That for a small piece of Money, he can, for I know not how long, preserve whole Barrels of Liquor. And a way he intimates, of fuming liquors with *Sulphur*, I have already told you, is a very good way of keeping them uncorrupted; provided, that (though he prescribes it not) they be six or seven severall times (seldomer or oftner, according to the quantity or nature of the Liquor) well impregnated with that imbalming Smoak; to which purpose, it is convenient to have two Vessels, to pour from one to the other, that whilst the Liquor is shaking in the one, the other may be well filled with Smoak; whereto I shall only subjoyn this secret, which a friend of mine practises, in preserving the fumigated Juyces of Herbs (as, I elsewhere informe you, I do to preserve other things) with a successe that I have somewhat wondred at; which consists, in adding to the thick Liquor to be preserved, a due, but small proportion of the white *Coagulum*, (which I often elsewhere mention) made of the pure Spirits of Wine and Urine.

That the Naturalist may find out wayes to preserve Medicines longer and better than is usual.

Of fuming Liquors with *Sulphur*.

And adding a little of the white *Coagulum* made of the pure Spirits of Wine and Urine.

But I have made this excursion too prolix, and therefore I shall only adde as a general admonition, That we are not, by the common practice of Vulgar Chymists to estimate what Knowing Naturalists, skilled in Mechanical contrivances, may be able in time to do, towards the making of Chymi-

call Remedies, as well more *cheap* as more *effectual*: and, indeed, to make them more *effectual*, is the best way to make them more *cheap*.

For, *Pyrophilus*, after all the wayes, that I have mentioned, whereby the charges, of the *Therapeutick* part of Physick, may be lessened: I must advertise you, both, That I make no doubt but there may be divers others found, which either through want of skill or leasure I have pretermitted, and that I have not yet named the principall of all; which is, That the deep insight into Naturall Philosophy may qualifie him that hath it, by severall wayes, and especially by discovering the true Causes and Seats of Diseases, to find out such generous and effectual Remedies, (whether Specificks, or more Universall *Arcana*) as by quickly freeing the Patient from his Disease, may exempt him from needing, either much Physick from the Apothecary, or many chargeable visits from the Doctor, or Chirurgion. Thus the rich Merchant I mentioned, in one of the former Essayes, to have been freed, by a Specifick, from the Gout: and the young Lady, cured of her Fistula's, by the infusion of *Millepedes*; might well, in the ordinary way, have spent, even supposing them thrifty, an hundred times more upon Physicians and Physick, than the potent and nimble Remedies, whereby they were so happily recovered, cost them.

[To which I shall adde, by way of Confirmation, both of this and of what I lately told you; concerning the Efficacy that may be, even in slightly Prepared Simples: what I came to learn, since the writing of the former part of this Essay, namely, that a young Lady, who I thought of great Birth, is yet of far greater Beauty and vertue, whom I presume I need not name to you) having been long troubled with an almost hereditary Epileptick Distemper; and after
having

That the most principal way of lessening the Charge of Cure, would be the finding out New and more effectual remedies.

having been wearied by courses of Physick prescribed her; by the famousst Doctors that could be procured, without at all mending, but rather growing worse, so that sometimes She would have, in one day, eight or ten of such dismal Fits, as You and I have seen her in; was cured only by the Powder of true *Mistletoe* of the Oake: given as much as would lie upon a Six-pence, early in the morning, in black Cherry Water, or even in Beer, for some dayes near the full Moon. And I am assured, partly, by the Patient her self, and partly by those that gave her the Medicine, That though it had scarce any other sensible Operation upon her, and did not make her sickish, especially, when she slept upon it: Yet, after the first day she took it, she never had but one Fitt. And this Remedy, an ancient Gentleman, who, being casually present when she suddenly fell down as dead, gave it her, professed himself to have constantly cured that Disease with it, when he could procure the right Simple, which is here exceeding scarce. And what further Experiment some Friends of Yours have successfully made, of its Virtue, I may elsewhere have occasion to relate.]

An History of
a radicated E-
pilepsy that
was cured by
the powder of
Mistletoe of the
Oake.

To which I shall only adde, That one of the Skilfullest Methodists I ever knew, having had much adoe to preserve a young Cousin of Yours from a very dangerous Cough, by a long course of Physick; the party, at the beginning of the next Winter, falling into a Relapse more threatening then the first Disease, was rescued from it in two or three dayes, by not many more taking of a Specifick sent her, made of nothing else but Harts-horn prepared as I lately taught You. And if such slight Medicines, consisting, each of them, but of a single Simple, not elaborately prepared, may sometimes (for I say not alwayes) performe such speedy cures even in Chronical Distempers; What may not be

be hoped from the *Arcana majora* (such as *Paracelsus's Laudanum* , so praised by *Operinus* himself; and *Buttler's Driff*, so extold by *Helmont*) when the skilfullest Preparations of the noblest Simples , shall come to be known by Learned and Judicious Men , intelligent in the *Theory* of Physick, and especially versed in the History of Diseases ? And though *Riverius* were none of the greatest Naturalists , or , at least, Chymists; Yet if in his Observation, and elsewhere, he flatter not his own *Febrifugum* ; how many Patients did that one Specifick, rescue from Quartanes, that would else probably have prov'd as Chargeable as Tedious ?

But, *Pyrophilus*, having sayd so much , that I feare you have thought it tedious , to shew that a Naturalist , skill'd in Chymistry and the Mechanicks, may assist the Physician to make his cures lesse Chargeable ; it is high time, that after so long an excursion, I proceed to consider in what other particulars he may be a benefactor to the Physicians Art.

C H A P.

CHAP. VIII.

Fifthly, then, that the Naturalists skill may improve the *Pharmaceutical* preparations of Simples, by severall wayes partly touched already, and partly to be, either, added or further treated of; the great variety of new Remedies, wherewith the Laboratories of Chymists have furnished the Shops of Apothecaries, may convincingly inform you. To which I must take the liberty to adde (and that upon serious Consideration) That the *Chymicall Preparations, hitherto common in Dispensatories, are, as to the Genearality of them, far enough from being the most Dextrous, or Noble, that can be devised*: For our Vulgar Chymistry (to which our Shops owe their venall *Spagyricall* Remedies) is as yet very incompleat, affording us rather a Collection, of loose and scattered (and many of them but casuall) Experiments, than an Art duely superstructed upon Principles and Notions, emergent from severe and competent Inductions, as we have elsewhere endeavoured more particularly, to manifest. And therefore till the Principles of Chymistry be better known, and more solidly establish'd, we must expect no other, than that, very few vulgar Chymicall Remedies should be of the Noblest sort; and that in the preparation of many others, considerable errours should be wont to passe unheeded: And faults gross enough, be apt to be mistakenly committed. But of this Subject, we may elsewhere have divers occasions to entertain You; and our single Essay, of the *Chymicall Distinctions of Salts*, will perhaps discover to You no small mistakes

Other proofs
that the Natu-
ralists skill may
improve the
Pharmaceutical
preparation of
Simples.

Of the best
ways to correct
Opium.

Of the best way
of correcting of
Mercurius Vite.

mistakes, in the preparation of divers applauded Vulgar Medicines. For it is not the Elaboratenesse, but the Skillfulness of preparations, that produceth the Noble Remedies, and a few Teeming Principles well knowne and applyed, will enable a Man with ease to make better Remedies; than a great many Furnaces and Glasses, though never so well contriv'd, and though very usefull in their kind. To make this out in some measure, I shall name some such Instances, as may withall confirme what I formerly delivered in this Essay, touching the possibility and usefulness of Correcting either poisonous, or otherwise very noxious Simples. I never knew *Opium* so much Corrected by Saffron, Cinnamon, and other Aromaticall and Cordiall Drugs (wherewith it is wont to be made up into *Laudanum*) nor by the most tedious tortures of *Vulcan*, as I have knowne it by being a while Digested in Wine, impregnated with nothing but the weight of the *Opium* of pure Salt of *Tartar*, as wee elsewhere more fully declare. (A much nobler *Laudanum* may be made by adding to the *Opium*, instead of the Salt, two or three appropriated Simples, and by due Fermentations and Digestions of them with it.) And for that violent Vomiting-Medicine, by Chymists flatteringly enough, called *Mercurius Vite*; a whole Pound of Cordiall Conerves, or Liquors, will not so well moderate its evacuating force, as the keeping it continually stirring in a flattish and well glaz'd earthen Vessell, placed over a Chafing-dish of Coales till it emit no more fumes, but grow of a grayish Colour: which I am very credibly informed to be the Preparation of *Merc. Vite purgans*, oftentimes mentioned and commended by the famous Practitioner *Riverius*, in his Observations. A not unlike, but far more sudden, Correction of that active Powder;

der , I elsewhere teach. And as for those Operative Minerals, *Quick-silver*, and *Antimony*, though long Experience of their churlish and untractable Nature have made many, of the waryer Physicians and Chymists, shy to meddle with either of them single : Yet these Concretes , which seem so Incorrigible, may , by being barely (in the gradual Distillation, of Butter of *Antimony*) sublim'd up together in a *Cinnaber*, and then that *Cinnaber*, six or seven times resublim'd *per se*, be united into a Medicine, that not onely is not wont to worke , either upwards or downwards , but of which I have knowne safely taken, even in substance, to the Dose of many Grains , and a few Drächmes of which, infus'd in a Pound or two of Wine, hath made it of that inoffensive Efficacy (taken, in the quantity of a Spoonfull or two, daily upon an empty stomach) That, if it still succeed as well as we have observed it two or three times to do , we may think that our having thus acquainted You with the Virtue of this unlikely Remedy, (though we have also met-with it, even, in Printed Books) may make you amends for all the rest of this tedious Discourse. I once knew a slight (but altogether new and tedious, as well as Philosophicall) Preparation of Salt of *Tartar*, Correct and Tame such Poysons , as ten times the quantity of the highest Vulgar Antidotes, or Cordials , would (I was confident) scarce have so much as weakened : And I have known by the same prepared Salt , dextrously Specified by Simples, the Virtues of some Vegetables so exalted , That, without any *Cathartique* or *Emetique* Operation, they have (if many Patients, of whom I had casual opportunities to enquire of the Effects of those Remedies upon them, do not misinform me) proved more effectually in Taming divers stubborn

An excellent
Medicine made
of those churlish
Minerals
Quick-silver
and *Antimony*.

born Diseases, then *Crocus Metallorum*, *Mercurius Vita*, (as it is abusively called) and those other dangerous Remedies; which make the Vulgar wont to say of Chymists, that they quickly either cure their Patients or kill them. And to let you see, *Pyrophilus*, by one plaine, and yet noble instance, That the knowledge of the Specifick Qualities of Things; skilfully applyed to preparations, may performe, with ease, what neither costly Materials, nor elaborate Processes are able to effect; Give me leave to inform You: That, whereas, Chymists and Physicians have not been able by infusing the true Glasse of *Antimony* (made *per se*) in Spirit of Wine, or the richest Cordiall Liquors; nor yet by torturing it after severall tedious and artificiall manners, to deprive it of its *Emetique* quality; That Vomitive faculty, of *Antimoniall* Glasse, may be Corrected by so slight a way, as that of Digesting it with pure Spirit of Vinegar, till the *Menstruum* be highly ting'd. For if you gently abstract all the Liquor, and on the remaining yellow or red Powder, you Digest well dephlegmated Spirit of Wine; You may after a while obtaine a Noble and not *Emetique* Tincture: Of which though *Basilius Valentinus* prescribes but five or six Drops for a Dose, yet a *Dometique* of mine having, out of curiosity, taken to the quantity of thirty Drops at a Time, he found it not at all Vomitive. And this Tincture we the rather mention, Because, not only *Basilius Valentinus*, but other skilfull Persons, highly extoll it for severall Diseases.

*Waxes to take away the Vomitive faculty of Antimoniall Glasse.

See his *Curus Triumhalis Antiquis*.

And let me adde, *Pyrophilus*, (and be pleased to marke well what I tell you) That by bare reiterated Digestions, and Fermentations, there may be prepared, out of many Vegetables, Saline and Sulphureous Essences (whose

(whose Bulk is exceeding small, in proportion to the Concretes whence they are Extracted) which will keep many Years; as I can shew you some above three Years old, and contain more of the *Crafsis* (if I may so call it) of the Simple, than the Vulgar Vegetable Waters, Spirits; Extracts, or Salts, hitherto extant in Laboratories and Shops. But there is so great a length of Time required, to the preparation of these Efficacious Juices, That my ambulatory condition of Life, hath not allowed me to furnish my selfe with many of them.

And, *Pyrophilus*, if You will not dis-believe a Person for whom You have so just an esteem, as You have for that Ingenious, and Experienced, *Monsieur L. F.* who was the French Kings Chymist, when You knew him at *Paris*; I can present You with a yet Nobler instance, to persuade You; That, if skill be not wanting, a single Herbe, without any violence of Fire, may, by other wayes than are in use among Chymists, be easily enough brought to afford Medicine, endowed with some Nobler Virtues than any of the most compounded, costly, and elaborate Medicines, whether Minerals or others, that are to be met with among Vulgar Chymists. This Efficacious part of the Plant, whence it is obtained, *Paracelsus* calls the *Primum Ens* of the Plant that yields it; But, though, indeed, I have found the way of preparing it much plainer, and better delivered, than is usuall in his Writings, at the end of his Booke *De Renovatione & Restauratione*: Yet I freely acknowledge, That I should scarce have thought it worth the Tryall, if it had not been for what the Experienc'd Chymist above-mentioned, affirmed to me, upon his own Observations, concerning it,

z 3

partly,

partly, because I am not wont to be forward, so much as to try long Processies upon *Paracelsus's* credit, and partly, because what he calls *Sal Solutum* seemed to me somewhat ambiguous; since in the same Page teaching to draw the *Ens primum* of Gold and *Antimony*, he makes not use of Sea-Salt but of (a Salt of an incomparably higher Nature) his *Sal Circulatum*; and in the Processe immediately preceding ours, to make the *Ens primum* of *Emeralds*, he prescribes the Calcining them in *Sale Soluta*, which agrees far better with his *Sal Circulatum*; then with any Solution of Sea-Salt, which seems very unlikely to be able to Calcine, and, as he sayes it must, dissolve *Emeralds*. But the way, that our French Chymist told me he used, was in Substance this: Gather, in a convenient season and time of Day, Baulm for instance, or some other fit Herb, (for experience hath taught, both him and me, that all Herbs are not fit,* by this way, to be reduced into Liquors) and having beaten it well, in a Marble-Morter, to a soft mash, placed in a Bolt-head Hermetically sealed, to Digest forty dayes in a Dunghill or some analogous heat; then, opening the Vessell, take out the Matter, which will be far more Liquid than before, from which, having separated the grosser pprs, You must Digest it in a gentle Bath, that the yet remaining grosser parts may subside; to which, being filtrated, You must, according to him, (for I find not that *Paracelsus* requires it) joyn the fixed Salt; of the grosser parts above mentioned, dry'd and calcin'd. To this prepared Liquor, You must adde equall parts of the Liquor of good Sea Salt well purified, and then melted, and suffered to run *Per Delli-quium*: This Liquor, being also sealed up in a convenient Glasse, must be exposed to the Sunne for about six Weeks;

A new and excellent way to get the *Primum Ens*, or essence, of some Vegetables.

Weeks ; at the end of which time there will swim at the top of it, the *Primum Ens* of the Plant in a Liquid form, transparent, and either green or red, or, perhaps, of some other Colour according to the Nature of the Plant. And though *Paracelsus* prescribes but Celandine, and Baulm, to be used, Yet having enquired of our Chymists, he told me, he had made such *Prima Entia* of *Scrophularia*, and, as I remember, of one or two other Herbes. But that which makes me thus, particularly, take notice of these kind of Medicines, is, That not only *Paracelsus* ascribes to the *Primum Ens* of Baulm, (or Celandine) the power of renovating them that use so much of it in good Wine as will give it a Tincture, early every Morning ; till, first of all the Nails of their Fingers, then those of their Toes, afterwards their Hair, and Teeth, fall off, and lastly, the Skin be dried and exchanged for a new one: But Your ingenious acquaintance assured me severall times, and once, in the presence of a famous Physician, and another *Virinso*, to whom he appealed, as knowing the truth of what he said ; That an intimate Friend of his, whom he named to me, having, after the above mentioned manner, prepared the *Primum Ens* of Baulm, to satisfie himselfe the better of its effects, made the Tryal upon himselfe, and took of it, according to the Prescription, for about a Fortnight : Long before which his Nails, both of Hands and Feet, began to loosen themselves from the Skin, (but without any pain) which at length falling off, of their own accord, this Gentleman keeps yet by him in a Box for a rarity ; but would not pursue the Tryall any further, being satisfied with what he had found, and being in no need of such Physick. But having given of the same Medicated Wine, for ten or
 twelve

The Influence
 of these *prima*
Entia to cause
 Renovation or
 rejuvenescence.

he saies out of commiseration to the sick) delivers, where he teaches that which he calls the *Via Media* of making the *Elixir Proprietatis*, of which he gives us this commendation: *Hoc medicamine tam Quartanam, quam continuam statim absolvi. Aded ut qui noctu suscepit Sacrosanctum viaticum, & olei extremam unctionem, me in prandio convivam circa lectum habuerit.* And though many think, that he has rather fraudulently, than rightly set the process down; yet experience has invited me to absolve him in this particular. (Though I must tell You, that because a Languid heat is not sufficient to make a Spirituous liquor ascend, and circulate as he requires; 'tis not every Chymist, that will, especially in his first trials, avoid the breaking of the Glasses, or at least the burning of the materials, to which accidents this preparation is very obnoxious, if it be not as well watchfully as skilfully made.) And though for my part, I have scarce us'd this *Elixir* but as a Cordial; yet I know some very expert Physicians, that have given it with great successe in divers difficult cases, and particularly a Friend of the younger *Helmonts* gives it so succesfully, that partly his Patients, and partly others that have try'd it, have sometimes taken of him, at a great rate, whole Pounds in a Year or too; and yet I know by his own confession, that, besides the skill he imployes in making it dexterously, he adds nothing but one Ingredient, to which I confess, I am not apt to ascribe any considerable part of the efficacy of the Medicine; which when made, he sometimes perfumes by cohobations with Musk, and Amber.

In tractatulo cui titulus sequuntur Quoddam Imperfectiora.

Of Helmont's Via media of Elixir Proprietatis.

and the perfuming it with Musk and Amber.

And *Cyrophilus*, that you may not wonder, that I, who think much of *Helmonts* Theory scarce intelligible, & take great exceptions at many things in his writings, should yet now and then commend Medicines upon his Authority, I

A Commenda-
tion of
Helmont's
Medicines.

must here confels to you once for all, that (always excepting his extravagant piece, *De magnetica vulnerum curatione*,) I have not seen cause to disregard many things he delivers, as matters of fact, provided they be rightly understood; having not found him forward to praise Remedies without cause, though he seem to do it sometimes without measure, and having more then once, either known, or even had considerable effects of Medicines he commends, which one of the happiest Practitioners I have met with, and one not lavish in extolling Chymicall Remedies has solemnly assur'd me, he has generally, though not alwaies, found more then ordinarily effectual. And upon occasion of this odde preparation of the *Elixir Proprietatis*, I shall adde that, Since Experience shews us, by what is dayly done in Chymical Laboratories, that upon the operation of the fire upon severall Concretes, substances of Nature oftentimes very differing both from the body that afforded them, and from one another, may be obtain'd; as the Oyles, and fixt Salts even of cold Plants or Hot: Since also, by the mixture of active Bodies new Concretes, endow'd with new qualities, may be produced; as we see that *Saccharum Saturni* emergeth from the conjunction of Lead, with the Acid Salt, distill'd Vinegar, & since to the same Concrete, according to the differing manners, after which 'tis handled, may acquire differing Qualities, as is clear in the various Medicines, afforded us by Quicksilver, & by Antimony, according as each of them is order'd; I cannot but think, that if Chymistry did no more then assist us, by the resolution of bodies, to extricate their more active parts, and partly by such resolutions, and partly by associating bodies together, to alter the former texture of Natures Productions, or present us with new Concretes of new Textures, by this very means,

means, if men want not Curiosity, and Industry to vary and prosecute experiments, there must necessarily arise such a store of new and active Medicines, that in all probability, many of them will be found endow'd with such Vertues, as have not been, at least in that degree, met with in the usual Medicines, whether simple or compound, to be bought in Apothecaries shops; and consequently, even without any notable discovery, or improvement of Principles, Chymists, (even as matters now stand with them) may considerably adde to the Pharmaceutical part of Physick. But if the Operations of Chymistry were seriously enquir'd into, and thoroughly understood, I make little doubt, but by a skilfull application of them, and especially by a *series* of them, in a rationall and orderly way, succeeding one another, there may be found out a great many preparations of Remedies, both very differing from the common ones, and far more noble than they. And to make this seem probable, I need but repeat some of the examples formerly mention'd; To which I shall adde now, that experience has inform'd me there is a way, whereby firmer consistent Substances, belonging to the bodies of Animals, may without the addition of any extraneous matter, and without any violence of heat, be reduced almost totally into liquor, and if I much misremember not, these Liquors without any violence of heat, afford their Spirituous & Saline parts, in a very gentle heat, and that before their Flegme. And I must peculiarly inculcate this, That if we had but a few potent Menstruums, to dissolve and unlock bodies with, I scarce know what might not be done in Chymistry. But when I speak of noble Menstruums, I mean not such as work like the generality of Corrosives, and the like Acid or Saline Liquors, which work but upon few kinds of bodies, and soon coagulate, or exantlate themselves.

Of the power of Chymistry.

Of the power of Noble Menstruums particularly.

selves by working, & thereby become unfit for future operations; but I mean such as either are separable with all their efficacy from the dissolv'd Body; as is said of the *Alkahest*, or such Saline or other piercing Liquors, as not being precisely either Acid, Urinous, or Alcalizate can dissolve a great variety of Concretes, without having their Vertue, I say not impair'd, but destroyed thereby; & unlock Mineraill bodies, far more then vulgar Menstruums, (as for instance by volatilizing them, or else making them irreducible, or working the like grand changes in them:) and if it be not quite seperated from the dissolv'd Body, is yet so friendly to Humane Nature, as to be free from either fretting, or other such dangerous and offensive Qualities, & rather to be of it self a powerfull Medicine. I should therefore exhort both You, & such other ingenious persons, as with the advancement of Chymistry, & Physick, (I might possibly adde Natural Philosophy too) to apply their Chymicall attempts, cheifly to the finding out of Noble Menstruums, for by being possessor but of one of these, a man may be able to doe a great number of things, that otherwise are not to be performed. As one of our ordinary Goldsmiths, by the knowledg he hath of *Aqua fortis*, can make many useful Experiments, about Silver and Gold, that before that Menstruum was found out, all of his Profession in the world, were never able in many ages to compass. Nor do I much wonder at that advise, which *Helmont* gives those that aim at the improvement of Physick, in these words: *Quod si ad istud ignis arcanum non pertingatis* (he was speaking of a prodigious, not to say incredible Liquor) *discite saltē, salem Tartari reddere volatilē, ut hujus medio vestras solutiones perficiatis. Qui et si sua soluta, an aticē homogenea deserat, digestus in nobis: illorū tamen aliquot vires multatus est, quos intra desert, plurimorum morborum*

*Helm. de
sehr. cap. 5.
num. 26.*

morborum domitricæ. For concerning this Salt, he not only
 elfewhere ſaies: *Dicam ſaltē pro ingenuis, quod Spiritus Salis*
Tartari, ſi unicornu, argentum, hydrargyrum, lapides cancerorū,
vel aliquod ē ſimplicibus diſſolverit, nedum febri, ſed & plu-
res affatim morbos ſanet, &c. But in another place he gives
 us, together with ſome account of its way of working, this
 great and comprehensive commendation of it. *Mirum ſanē,*
ſaies he, quantum ſal Tartari, vel unicum, volatile factum, non
preſtiterit: Nam omnem ē venis amurcam detergit & obſtru-
entium contumaciam, diſpergitque apoſtematum ſuſcepta con-
ciliabula. De hoc ſalis (& non olei) ſpiritu, verum eſt illud
Paracelli, quod quocunque non attigerit vix aliis potentior per-
veniet. Theſe paſſages I ſhould not think worth tranſcrib-
 ing and laying together, but I find that beſides the con-
 current Teſtimonies of *Helmont, Paracelſus, and Baſilius* in praiſe
 of this Salt, the generallity of the more inquiſitive Chy-
 miſts, without excepting the more ſober and judicious, do,
 by the various and painfull, though fruitleſſe, attempts they
 have made to Volatilize Salt of Tartar, conſpire in acknow-
 ledging it a thing highly worth labouring for; nor doe I
 for my part ſee (whatever ſome ſay to the contrary, and
 however I have indeed found it more difficult, then perhaps
 a Novice in Chimiſtry would think) it ſhould be impoſſible,
 for I have more then once with eaſe enough, made Gold it
 ſelf volatile, though it be confeſſed to be the fixeſt body in
 the World, and conſequently more fixt then Salt of Tartar,
 which in an open veſſel, may be in time made to flie away
 by a vehement fire; And I have likewise by an unuſuall
 Method, that I have elfewhere deliver'd, more then once ob-
 tain'd from a mixture of crude Tartar, and two or three
 Mineral bodies good ſtore of true Volatile Salt, which I
 could ſee no juſt cauſe not to think afforded by the Tartar.

But

Helm. de
febr. cap.
17. vel ſ.
ſinca.

Helm. de
ſcholar.
Humorista.
paſſ. decept
cap. 2. nu-
mero 89.

The power
of Sal Tar-
tari Vola-
tile d.

Of the poſſi-
bility of Va-
latizing it.

But I must confess this may be rather a volatile Salt of Tartar, than Salt (that is Alkali) of Tartar made volatile, and therefore the principal thing I mention it for, is to shew you that Tartar it self, by an unusuall way of management, may be brought to afford an unusuall kind of Salt. But this I can tell You, that an ingenious acquaintance of mine, whom notwithstanding my wounted distrusts of Chymists, I durst credit, affirm'd to me, that he had himself seen a true and real *Sal Tarteri Volatile* made of Alkali of Tartar, and had seen strange things done with it, insomuch that he believ'd most of the things, that *Helmont* delivers of it. For my part I am inclin'd to think that Salt of Tartar may be made volatile, (whether in the form of a sublimate or a Liquor) by more ways then one, though not all of them neer equally good: & whereas one of the best (if not the very best) of the wayes of volatilizing it, seems to do it principally with Spirit of Wine, and the great difficulty of that way consists in bringing this Spirit to associate with the Salt: I have seen Salt of Tartar of my own, brought to that passe which great Virtuosi have long in vain attempted to bring it unto, namely, to flow readily upon a red hot Iron, & also to take fire, & burn with a conspicuous flame, besides that when it had been dry'd by a smart fire, to drive away any parts that did not firmly adhere to it, it would yet readily dissolve in high rectify'd Spirit of Wine, which you know Salt of Tartar will not otherwise doe; not to mention the change of its Alcalizate taste, and other lesser alterations, but what I can further say of this matter, I must not declare in this place.

And *Pyro*. That You may not be as many other Virtuosi, discourag'd from labouring for noble Menstruums, by the confident perswasion of many, who believe *Angelus Sala* & *Guthberus Billychius* (whom I deny not to have been Learn-
ed

ed Men, do not take to have been great Masters of Chymicall *Arcana* fit to determine with authority, what can, & what cannot be done by Chymistry, least I say You should be, by such mens inconsiderate severitie, brought to despair of ever seeing any noble Menstruum, that is not sharp to the taste, nor of any of the three peculiar kinds of Saline Liquor. (Acid as *Aqua fortis* Urinous, as the Spirits of Blood, Urine, and other Animal substances, nor Alcalizate, as Oyl of Tartar *Per deliquium*) I shall assure you, that to my own knowledge there is in the world a kind of Menstruum, that consists of a pure ChrySTALLINE substance, that is made by the fire, and as truly Saline as Salt of Tartar it self, which strang Salt, though well purified, and readily dissoluble, as well in dephlegmed Spirits of Wine, as common Water, and though it be totally volatile (whence you may guesse of how Saline a nature it is) and also be either way reducible to a noble Menstruum, does really tast sweet; I mean not in the Chymicall sense, by want of sowerness (as when they say that the *Calces* of corroded and precipitated things are dulcify'd by frequent ablutions) but by a positive sweetness. And whereas the vulgar Saline Menstruums, (which alone seem to have been known to *Sala & Billychins*) are so speciflicated, if I may so expresse it, that what an Acid Menstruum dissolves, an Alcalizate, or an Urinous will precipitate, & *converso*; And whichsoever you choose of these three sorts of Menstruums, one of the other two will disarm and destroy it. I have found by trial, not only that a Red Tincture of Glasse of Antimony, being drawn with a Menstruum that was but a degree to this Liquor, I could not precipitate it like our common Tinctures, either with Spirit of Urine, or an Alcalizate Solution. But that (which is farre more considerable) though it would readily mix with Acid

That there may be other Menstruums besides such as are Acid, Urinous or Alcalizate.

How these several disarm and destroy one another, and what an Acid Menstruum dissolves, an Urinous or Alcalizate doth precipitate.

Of a Menstruum unlike to all these.

Spirits

Spirits, as Oyl of Vitriol, with Volatile and Urinous Spirits, as Spirits of Urin it self, and with Alcalizate Solutions; yet would neither of these three make any Ebullition at all with it, or seem to work at all upon it. But of such Matters no more at present.]

CHAP. IX.

That Chymistry it self (much more Chysiology) is capable of affording a new and better Methodus Medendi.

YOU will perhaps expect, *Pyrophilus*, that, Treating of the advantages that may accrew to the Therapeutical part of Physick, from a more accurate knowledge of Natural Philolophys, I should tell you with the Chymist, that Chymistry it self, and much more Physiologi in its full extent, is not only capable of improving the Pharmaceutical part or Preparations for Remedies; (for, that we confessed already) but also of affording us a new & much better *Methodus medendi*, or skill of using the helps that Nature or Art hath provided against Diseases. And indeed the Physitians Art is so difficult, and a man must know so many things to be, though not tolerably, yet perfectly skill'd in it, that it may without disparagement to Physitians, be thought yet capable of being improved, if not of being reformed. *Hippocrates* begins his Aphorismes with a complaint, that Life is short, but Art long. And *Paracelsus* himself, though he say after his boasting manner, *Ars est longa, vita brevis, ubi autem donum finis* (as he speaks) *est, ibi ars est brevis, vita verum longa si arti conferatur*: Yet expounding the same words a little above, he saith, *Itaque Hippocrates merito de eo conqueritur: nam & affectis ipsius idem accidit: Ars medica consistit in Philosophia, Astronomia, Alchymia & Physica, merito igitur dici potest Artem esse longam. Multum enim requiritur temporis, ad quatuor has Columnas Medicinæ descendas*

scendas & perscrutandas. Celsus, who hath been stiled Hip-
 pocrates *Latinorum* doth more then once call Physick a Con-
 jectural Art, as particularly in that place where he saith,
Est enim hæc ars conjecturalis, neque respondet ei plerumque
non solum conjectura sed etiam experientia. And well might
 these great men acknowledg their Art to be difficult, since
 the two Instruments (as Galen calls them) of finding Arts,
 being Judgment and Experience, Hippocrates gives this
 Character of them; ἡ δὲ πείρα σφαλερὴ, ἡ δὲ κρίσις χαλεπὴ. And
 that Experience may be uncertain without the Theory of
 Physick, he that so much build's upon Experiments, Para-
 celsus, himself seems to confess, where expounding the
 words of Hippocrates, he saith, *Hoc modo se habuit Medicina*
in Principio; ut nullam Theoriam habuerit, sed solum Experi-
entiam hoc laxare, hoc conspiciare, quomodo autem & cur, id ig-
noratū fuit: ideo unus salvatus est, alter perditus, nunc autē, &c.
 And concerning the Critical part of Physick (to allude to
 Hippocrates his expression) Galen who exercised his reason
 so much about it, tells us, that *Per rationem judicium haud*
quaquam facile existit, sed, si quid aliud, maximam habet di-
fficultatem. And to affirm the difficulty of finding the best
 way of employing reason to the cure of Diseases, not only
 by the Authority of Galen, but his Arguments; Let me in-
 form you, that after having told us how difficult a thing,
 and how rarely to be found is that reason, which considers,
 and determines what on every occasion is to be done, *Ne-*
que enim (addes he) si veritas esset inventu facilis, tot ac tanti
viri in ea quærenda occupati, in tam contrarias scēdas fuissent
unquam dispersiti. And Paracelsus, whatever he often else-
 where boastingly affirmeth of himself, yet handsomely e-
 nough both expreſsēth & confessēth the difficulty of being
 a good Physitian, in one of his Prefaces to the Students of

Paracelsus
in his Pre-
face to his
Bertheona,
or Chirurgia
Minor.

Physick, whereas he saies, *Non Titulus, non Eloquentia, non Linguarū peritia, nec multorum Librorum lectio (& hæc non parum exornant) in Medico consideranda, sed summa rerum ac Mysteriorum cognitio, quæ una facile aliorum omnium vices agit. Rhetoris qui-tem est diserie posse loqui ac persuadere atq; judicem in suam sententiam trahere. Medici autem effectuum genera, causas ac symptomata novisse, & iis insuper sagacitate ac industriâ Pharmaca applicare, atque pro cujuslibet ingenio ac ratione vel cunctis mederi :* But though, *Pyrophilus*, after the acknowledgments made by such great men of the almost insuperable difficulty of their Art, you would perhaps think it no great presumption, if a man should attempt to innovate in any part of it, & consequently even in the *Methodus medendi*: Yet, *Pyrophilus*, I am much too young, too unlearned, and too unexperienced, to dare to be dogmatical in a matter of so great moment. And the Physicians are a sort of men, to whose learned writings on almost all subjects, the Commonwealth of Learning is so much beholden, that I would not willingly dissent from them, about those notions in their own profession, wherein they seem generally to agree; And do very much disapprove the indiscreet practise of our common Chymists & Helmontians, that bitterly and indiscriminately rail at the Methodists instead of candidly acquiescing in those manifest Truths, their Observations have enricht us with, and civilly, & modestly shewing them their Errors where they have been mistaken. And yet, *Pyrophilus*, Since divers of the eminentest Methodists themselves have more then once ingeniously acknowledged to me, and seriously deplored with me, in the compleatness of their Art, (which perhaps made (that Learned Prince) the late King tell them, that they were at best but good guessers) and since about divers particular diseases we have

have observed, the Method of some of the most reputed Doctors of *England* (which yet, I think, is at this day as well stored with Learned Men of that profession, as any part of *Europe*) not only differing, but repugnant to each other; I suppose we may without disrespect to their profession, dissent from the most of them about those cases, about which they are reduced to disagree so much among themselves. And it would be worth an impartial disquisition, whether, since the *Methodus medendi* ought to be grounded on, and accomodated to, the Doctrine of Diseases, the new Anatomical discoveries formerly mention'd, and others not yet publish'd do not by innovating divers things in *Pathology*, require some alterations & amendments in the *Methodus medendi*? But in this particular, I dare yet affirme nothing, and therefore shall proceed to observe to you, that the unusual efficacies of new remedies, may probably make the method of curing more compendious, because (as I lately also intimated) one Medicine may be so richly qualified, as to answer several intentions, which in the common way require diversity of Helps and Remedies. Thus, for instance in the Cure of the Kings-Evil, by the received method, the Physitian must propose to himself several scopes (suited to several indications) & prosecute them successively with distinct & appropriated Remedies. But I have (as I formerly also told you to another purpose) known a single Specific Simple Namely (*Paronychia folio Rutacco*) given only in small Beer, in not very many daies, without any sensible Evacuation, waite the peccant humour, appease the pains (which before were very great) and discusse the unbroken Tumours, and heal the broken ones. Thus, according to the known Method, the great Remedy in Plurisies is copious Blood letting, which is strictly prescribed even to aged persons and teeming Women, by the famous

est

Instances to prove that the unusual efficacies of new remedies may alter the method of curing more compendious. In the Kings Evil.

In Plurifies, est of our practitioners, & I confess, not irrationally, where the Physician is furnisht but with vulgar Remedies: and yet by some *Helmontian* Medicines, we have known Plurifies cured even in young men, without Phlebotomy, and our selves, some while since made a succesful trial of that Nature in a young Gentleman not unknown to you, which I mention not, with *Helmont*, to reject or so much as to disparage *Phlebotomy* in this disease (for so it be moderate & seasonable, Experience shews it frequently proves useful) nor as if we had observ'd all *Helmonts* boasted Remedies (though for the most part good ones) to be constantly succesfull; but to give you an instance of the truth, of what I was saying before, That new & more generous Remedies may so far alter the received *Methodus Medendi*, as to make divers of its prescriptions unnecessary. Of this truth, *Pyrophilus*, another instance might be afforded by the *Rickets*, a new & abstruse disease, at least as is supposed, & sometime so stubborn, that one of the famousst Physicians in *Europe*, (whom I think I need not name) hath not been able of late to cure it in several of his own Children. And yet I suppose you may have heard that Excellent Person your Mother, several times mention her having performed divers cures (some of them improbable enough) of this Disease, barely by that slight preparation of *Colchothar*, lately taught you, and presented Her by us; And by which (we having made & distributed, at Her desire, a considerable quantity of it) several other Persons have freed Children from that disfiguring Sickness: Of which, but few Moneths since, your little Cousin *D.* being sick almost past hope, was a while since brought out of danger, by Gods blessing vpon some of the same Remedy, wherewith we presented her Mother, together with our perswasions to try it in her own Child, as she had

had successfully done on the children of divers others. And yet this Remedy (to adde that upon the By, in favour of something to be said anon) works almost insensibly, save that in many bodies it is, especially at first, Diaphoretique. And this property of that Remedy minds me to adde, that it would not be amiss for Physicians, to consider whether or no (however, Bleeding, Purging, Vomiting, Issues, Glisters, Scarifications, and those other painful wayes of Evacuation, be not (however Chimists are too bitterly & undeservedly wont to reject them) to be altogether condemned and laid aside, yet) there may not in some particular diseases & bodies be found more gentle, & yet effectual waies of discharging Nature of that which offends her, then those painfull and debilitating ones, which we have mention'd (without the use of one of the chief of which, namely *Phlebotomy*, we see that almost all kind of diseases are cured in Children.) The contributing to render the waies of Cure less painfull & weakning, would gratifie so great a part of those who may need Physick, that I hope you will easily pardon my spending some pages to that purpose. I consider then, that oftentimes the peccant matter, though very offensive by its qualities, is much lesser then is supposed, in quantity, and might, if we were but Masters of Specifique Remedies, either be breathed out by insensible transpiration, or carried off by Sweat or Urine, without tormenting, or weakning the Patient, by those other copious Evacuations of grosser matter, which are alwaies troublesome & painful enough, though not alwaies essential. Nay that even in Chirurgery it self, if those that practise it were as knowing as Nature has been bountiful, there would not be so often a necessity as 'tis commonly supposed there is of mutilating or tormenting the Patient to recover him, You cannot doubt, unless

less You will deny what *Gulielmus Piso* affirms, upon his own observation, of the Cures done by the illiterate Indian *Empericks*. The passage You have seen already; But to it he adds so notable and ingenious an acknowledgment, that I cannot but honour him for it, and be willing to make way for the Credibility of a good part of what we are hereafter to deliver, in this discourse, by premising it. *Immo* (continues he) *ex venenatorum fungorum aliorumque toxicorum esu, solo po:n infusi recentis radicis Jaborandi in instanti à litho vindicator, me aliisque Galeni Nepotibus baud parum pudore suffusus, post tot alexipharmacorum & theriacalium Antidotarium irritos conatus. Ita ut postea ejusmodi collegas barbaros subinde mihi adjungi passus sim, non adeo quidem nostratum valetudinem ad tactum arteriarum moderari quam dictis modis consilii copiam præbere solitos.* Thus farre he: Which premis'd, let us proceed to consider, more particularly, some of the less painfull waies of freeing men from Diseases.

CHAP. X.

That great
Cures may be
done by out-
ward Applica-
tions.

Franciscus
Bernius,
Donzellinus,
Franciscus Bur-
geavius, who
commend it
upon their own
experience, be-
sides very ma-
ny that com-
mend it in gene-
ral termes.
* de Lapid. &
Gemm. lib. 2.
c. 11.

THAT great Cures may be done by bare outward Applications, You will scarce deny, if you dis-believe not the Relations which are made us, by Learned men, concerning the Efficacy of the *Lapis Nephriticus*, only, bound upon the Pulses of the Wrist's (chiefly that of the left Hand) against that stubborn and anomalous Disease the *Stone*: And that which gives the more credit to these Relations is, That not only the Judicious * *Anselmus Boetius de Boot* seems to prize it, but the Famous *Monardes* professeth himself not to write by Hear say of the great Vertues of this *Indian Stone*, but to have made tryal of it Himself upon persons of very high Quality:

Quality: And that which is related by * *Monardes* is much * *Nicolas*
 less strang, then those almost incredible things which are
 with many circumstances delivered of that Stone, by the *Monardes*
 Learned Chymist * *Untzerus*. And although it must be ac- *de simpli.*
 knowledged, That some Stones, that go under the name, *Ind. Hist.*
 have been ineffectually applied in *Nephritick* Distempers, *c. seu tit. 20.*
 Yet the accurate *Johannes de Laet* Himself, furnisheth us *De Nephrit. lib. 1.*
 with an Answer to that Objection, informing us that many *s. 24. where*
 of those *Nephritick* Stones (which differ much in Colour, *he hath*
 though the best are wont to be greenish) although not at *nine or ten*
 all Counterfeited, or Sophisticated, are of little or no Vertue. *observat ones*
 But that yet there are some others of them which can scarce *rara & in-*
 be distinguished from the former, but by tryal upon *audita de*
Nephritick persons, which are of wonderful Efficacy, as he Him- *Lap. Nephritico.*
 self hath more then once tryed in his own Wife. *Of the effi-*
Garcias *ab Orta* (*Lib. 1. Cap. 33.*) mentions a Stone, found in *cacy of Lapis Nephriticus*
Bala- *gat*, call'd *Alaqueca*; of which he tells us, That though it be *and o-*
 cheap, *Hujus tamen virtus* (to use his own words) *ther appen-*
reli- *quarum Gemmarum facultates exuperat, quippe qui sanguinem*
undiquaque fluentem illico sistat. *Monardes* (*cap. 35.*) re- *sa.*
 lates the great Vertues of a Stone against Hysterickall Suffo- *De Gem. &c*
 cations, and concludes, *Cum uteri Suffocationem imminen-* *Lapidibus!*
tem presentunt, adhibito lapide subito levantur, & si cum *lib. 1. c. 23*
perpetuo gestant (Hysterici) nunquam simili morbo corripi-
untur, exempla hujusmodi faciunt ut his rebus fidem adlibe-
am. The same Author in the next Chapter, treating of
 the *Lapis Sanguinarius*, or Blood Stone, found in new Spain,
 (having told us, that the *Indians* do most confidently be-
 lieve, that if the flesh of any Bleeding part be touched with
 this Stone, the Bleeding will thereby be stanch'd) adds this
 memorable Observation of his own, *Vidimus nonnullos ha-*
meroidum fluctu affixos remedium sensisse, annulos ex hoc
lapide

lapide confectos in digito continue gestando; nec non & Menstruum fluxum sisti. And of the formerly mentioned *Lapis Porcinus*, the Experienced *Bontius* (having mentioned how the *Indians* give the Wine wherein it hath been steeped, against the Disease called *Cholera*; which is as much, and as justly feared, by the Islanders of *Java*, as the Plague is in *Holland*) adds this memorable passage, *Pregnantibus tamen hic lapis non bene datur; nam abortum provocare adeo certum est, ut femina Malaica mihi retulerint ut si quando Menstrua eorum purgatio non bene procedat, si saltem hunc lapidem manu gestent juvamentum se inde sentire.* And the relations, *Pyrophilus*, that I may in another place present You with, concerning the wondrous Stone, formerly mentioned, with which your Grandfather performed such eminent Cures, (particularly of the Stone in the Lord of *Falkland*, then Deputy of *Ireland*, and others, to whose Backs it was applied) will, I suppose, make you the more readily give credit to the relations of the Authors we have newly mention'd. What *Monardes* mentions of the Vertue of the *Lapis Sanguinarius*, to Cure *Hæmorrhoidal Fluxes*, puts me in mind of a yet much stranger thing, which *Helmont* affirms, namely, That he could make a Mermal, of which, if a Ring were worn, the pain of the *Hæmorrhoids* would be taken away, in the little time requisite to recite the Lords Prayer; and within twenty four hours the *Hæmorrhoids* themselves, as well internal as external, how protuberant soever, would vanish, and the stagnant Blood would (as he speaks) be received again into favour, and be restored to a good condition. The same Ring he also commends in the suffocation & irregular motion of the Womb, & divers other Diseases: But if *Paracelsus* be in any case to be credited in an unlikely matter, We may think, by his very solemn Protestations, that

Helm. de
Febr. c. 2.

that he speaks upon his own experience; That he had a Ring made of a Metalline substance, by him called *Electrum*, (which, by his description, seems to be a mixture of all the Mettals joyn'd together under certain Constellations) which was of far greater vertue then this of *Helmont*; For, *hoc loco* (saies he) *non possum non indicare admirandas quasdam vires virtutesque electri nostri, quas fieri his nostris oculis videmus, adeoque cum bona veritatis conscientia proferre attestari que possumus. Vidimus enim huius generis annulos, quos qui induit, hunc, nec spasmi convulsit, nec Paralysis corripuit, nec dolor ullus torfit, similiter nec apoplexia, nec epilepsia invasit. Et si annulus huiusmodi Epileptici digito annulari, etiam in paroxysmo semissimo, incertus fuit, remittente illico paroxysmo, ager à lapsu illico resurrexit. &c.* But to take notice of some other outward Remedies. To our present Theme belongs that noble Cure, performed by the famous and experienced *Fabritius ab Aquapendente*; who tells us, That he Cured a man of a *Scirrhus Lienis*, and a Dropsy, by the long use of Sponges, moistned with common Lime Water, and then expressed and worn upon the Spleen; notwithstanding the Muscles of the *Abdomen*, and all the other parts that lye betwixt the applyed Spong and the part affected. And to this we may adde, the strange Cures mention'd by *Kircherus*; and confirmed to me, by a Learned eye-witness, to be frequently performed of very dangerous Diseases, in that Cave, nere *Rome*, where the Patient being exposed stark naked, and tyed Hand and Foot, upon Beds of Straw; and being by the *Sulphurous* vapour of the place, and somtimes their own fear, cast into a sweat, are lick'd well by a great number of peculiar kind of Serpents that inhabit that *Grotta*. Moreover, We oftentimes see Agues Cured by Amulets and Applications

Paracels in
Archidox
Magic, lib:

De Operat.
Chirurg p. 21
cap. 15.

The Cures of
the Dropsy
& Scirrhus
Lienis by the
external appli-
cation of Spon-
ges wipt in
Lime water.

Of strange
Cures perform-
ed nere Rome
in the Serpen-
tine Grotta.

to the Wrists. And I my self was, about two Years since, strangely Cured of a violent *Quotidian*, which all the wonder Method of Physick had not so much as abated, by applying to my Wrists a mixture of two handfuls of Bay Salt, two handfuls of the freshest English Hops, and a quarter of a Pound of blew Currans, very diligently beaten into a brittle Mass, without the addition of any thing moist, and so spread upon Linnen Cloath & tyed about the Wrists, And with the same Remedies (which yet we have observed sometimes to fail) have divers others been cured, both of *Quotidian* and *Tertian* Agues : Nay an Eminent Physitian gave me, lately, thanks for the great Effects he had found of it, even in continual Feavours.

Of the Operations of Sulphur, Cantharides, Quick silver and Tobacco externally applied.

And here, *Tyrophilus*, I shall not scruple to acquaint You, with my having sometimes wished, that Physitians had been a little more curious to make Observations and Tryals of the distinct Operations of various Bodies outwardly applied. For I consider that, in some of them, the subtle Corpuscles, (which seem to insinuate themselves into the Pores of the Body, and into the Mass of Blood, with little or no alteration) have much the like Operations with the Body whence they axhale, taken in at the Mouth. As we see in some Preparations of *Sulphur*, which have like Vertues, inwardly given, and outwardly applied; and more manifestly in *Cantharides*, which I have found, by external application, to work strangely upon the Bladder, as that they excoriated it when taken into the body; & yet more manifestly in *Quick silver*, which by inunction may be made as well to Salivate, as if it were swallow'd down. And an eminent Physitian lately complain'd to me, That washing a Childs scabby head with a Decction of Tobacco, to kill and dry up the Scabs, the Boy was made thereby both sick

sick and drunk: And Learned Men assure us, That, by some *Catharticks* outwardly applyed, those may be purg'd that will not swallow Physick. But other Medicines there are, which, before they get into the Mass of Blood, are much alter'd; either in straining through the Flesh and Membranes of the Body, or in the Digestions they pass through in the Stomack, and elsewhere: And these may have very differing Effects, inwardly given, and outwardly apply'd; as, in the formerly mention'd instance of Hops, Currans and Salt, neither any of the Ingredients inwardly given, nor the mixture hath been (that I know of) noted for any Febrifugal Vertues. So likewise Turpentine and Soot that inwardly taken are good for quite other Diseases, (as Plurisies, and Obstructions of the Kidneys) outwardly applyed are the main Ingredients of *Pericarpinms*, extoll'd against Agues. And *Mille-folium* or Tarrow, besides the Vertues, it hath inwardly against Diseases of quite other Natures, being worn in a little Bag upon the tip of the Stomack, was (as Himself confess'd to me) the Secret, against Agues, of a great Lord, who was very curious of Receipts and would sometimes purchase them at very high rates; And a very famous Physician, of my acquaintance, did since inform me, That he had used it with strange success. I know also a very happy Physician, who assures me, That he hath very often cured, both in himself and others, the Chilblains when they come to be broken, by barely strowing on the sore parts the fine powder of Quinces thinly slic'd and dried. And who knows what unexpected Operations divers other Bodies may have, when outwardly applyed, if various Trials of that Nature were skilfully made; especially, since we see that (for reasons elsewhere to be considered) some Bodies seem to have quite contrary Operations, when out-

wardly

*Instances in
divers Me-
dicines
which have
differing ef-
fects in-
wardly gi-
ven and out-
wardly ap-
plied.*

wardly applyed and inwardly taken. For we see that Spirit of Wine does, in several cases, allay the inflammation of the external parts, which given inwardly, would quickly inflame the body. And our often commended *Riso*, speaking of a choice Remedy for those distempers of the Eyes, that used to trouble Men in *Brasil*, addes, *Idem quoque præstat manipahera, ex radice Mandihoca, quæ licet pota venenosa habeatur* (as we formerly noted out of his and other Testimonies) *oculis tamen prodest, visumq; emendat.* And if the Simples, to be outwardly applyed, be skilfully prepar'd, That may much vary & improve their operations. As we see that Vitriol, which is made of Copper, or Iron corroded by, and Coagulated with Acid Salts, hath outwardly divers Vertues which crude Copper has not, either outwardly or inwardly. And Gold dissolved in *Aqua Regis*, and precipitated with Oyle of Tartar, is inwardly, as far as I can discover, gently Purgative; yet the same *Aurum fulminans* being calcin'd with twice or thrice it's weight of Flowers of Brimstone, till the *Flores* be burnt away, is known to be much commended by Chymists, and others, for a Diaphoretick. But though, as to any outward Vertues of the same Powder, Physicians and Chymists are wont to be silent, yet probably it may have very great ones, as well as quite differing from those it has, being taken at the Mouth. For I know a Person, that being grievously tormented with exulcerated *Hæmorrhoides* a very expert Chymist of my acquaintance, not knowing what else to do, applied to the part affected, an Oyntment consisting only of *Aurum fulminans* prepared and fixed by a slight and familiar way (which you may command) & made up with a little Oyl of sweet Almonds, into a requisite consistence; and though presently upon the application of the Remedy, the pain for a quarter of an

Houre

That preparation may much improve Simples which are outwardly applyed.

Instances in divers preparations of Gold.

An Ointment made of Aurum Fulminans for the Hemorrhoids and Venereal Ulcers.

Hourc hugely increased, yet soon after it abated, and the Hemorrhoides the next day were closed, and the day after went away ; Nor has the Patient ever since (that is, for some Years) been troubled with any thing of Relaps. And the same Physitian assures me, that with the like Remedy he has found a strang effect in Venereal Ulcers. And perhaps to this may be referred what has been found by some friends of mine, that Phlegm of Vitriol, & *Saccarum Saturni*, which not only inwardly given are said much to cool the Blood, but outwardly applyed are good for Burns & hot Humours, doe yet potently discusse cold Tumours. But least you should say, that this diversity may proceed (at least in part) from the Corpuscles of differing Natures, that may be imagined in the forementioned Medicines, I shall return to what I was discoursing of before, and take notice of the Efficacy of some other external Remedyes.

[Since the beginning of this ESSAY, I saw a lusty and very sprightly Boy, Child to a Famous Chynical writer, who, as his Father assur'd me and others, being by some Enemies of this Physitians, when he was yet an Infant, so bewitcht that he constantly lay in a miserable torment, & still refusing the Breast, was reduc'd by pain & want of food to a desperate condition, the experienc'd Relater of the Story, remembring that *Helmont* attributed to the *Elidium Minerale immaturum Paracelsi* the Vertue of relieving those whose distempers come from Witchcraft, did according to *Helmonts* prescription, hang a piece of this Noble Mineral about the Infants Neck, so that it might touch the tip of the Stomack, whereupon presently the Child, that could not rest in I know not how many Daies and Nights before, fell for a while a sleep, and waking well, cry'd for the Teat, which he greedily suck'd, from thenceforth hastily recovering

The Cure of a Person esteem'd Bewitcht by an appended Mineral.

ring, to the great wonder, both of his Parents, and several others that were astonish'd at so great and quick a change. And though I am not forward to impute all those Diseases to Witchcraft, which even Learned Men Father upon it; yet its considerable in our present case, that whatsoever were the cause of the Disease, the Distemper was very great and almost hopeles, & the cure suddenly perform'd by an outward application, and that of a Mineral; in which compacted sort of Bodies, the finer parts are thought to be more lock'd up.]

Among the proofs of the efficacy of apprehended Remedies, we must not pretermitt the memorable Examples, that are deliver'd by the Judicious *Boëtius de Boot*, concerning the Vertues of that sort of *Jasper*, which is blood-red throughout the whole body of the Stone, not being mingled with any Colour: *Testari possumus (saies he) me, qui alias lapidibus & gemmis tantas vires, quantas vulgus solet, non tribuo, credibile vix, de Jaspidis viribus, observasse. N. Am cum ancilla fluxu menstruorum ita laborasset per aliquot dies, ut nullo modo sisti posset, Jaspidem rubram impositam & rudem femori alligari jussi. Alius (in eadem Domo) cum in pede vulneratus esset, nec sanguinis fluxus cohiberi posset, admoto lapide, extemplo impeditus fuit, licet vulnus non tegeretur.* To these he adjoynes a much more memorable Example, of a Maid he cur'd at *Prague*, who had been for six years sick of an Hemorrhagy so vehement, that there scarce ever pass'd a Week, in which she did not several times Bleed, neither could she be reliev'd by any Remedies, though she had long us'd them, till she was quite tired with them; wherefore our Author setting them all aside, lent her a *Jasper*, of whose Vertue in such cases he had made good trial, to hang about her Neck, which when she did, the Flux of blood presently ceas'd,

Of the power of Jasper to staunch Blood.

De Lapid. & Gem. l. 2. cap. 102.

ceas'd, & she afterwards for curiosity sake, oftentimes laying aside the Stone, and as often as she needed it, applying it again, observ'd, that whereas the flux of Blood did not presently return upon the absence of the *Jasper*, but after divers Weeks, yet upon the hanging it on again it would presently be stopt, so that she could not ascribe the relief to any thing but the Stone, by which our Authour tells us, that at length she was quite cur'd: And speaking of the praises given by others to Green *Jasper* speckled with red, he concludes, *Sed ego, quod multoties expertus sum, refero.* But amongst the Operations of outwardly iappended Medicines, I have scarce met with a stranger then that which the Experienc'd *Henricus de Heer*, mentions in the fourteenth of those Observations which he truly styles *Rare*, namely, That a Woman, who had by an unskilful Mid-wife the Bladder Lacerated, and thereby been subject to a perpetual *Incontinentia Urinae*, and had been reduced constantly to wear a Silver Pipe, was perfectly help'd, by wearing, as a Gypsie had taught her, a little Bag hung about her Neck, containing the powder made of a live Toad, burnt in a new Pot: Which relation I the rather mention, not only because the Author having try'd the Remedy upon a Merchant, to whom an unskilful *Lythotomist* had left the like Disease, found it presently to succeed; But because having been very desirous to have further trial made of so odd a Remedy, by a curious Physitian, he lately gave me this Account of it, that though in one or two it had fail'd yet having given some of the Powder to an exquisite Person, known to us both, he assur'd him it had succeeded in two or three. (And the Disease is too unfrequent, to give occasion to have the Remedy often tried) And the Physitian adds, that one of those Patients tells him, (the Physitian) That though her infirmity were occasion'd by a *Lacera-*

In Ob'erv.
Medic. op-
pido rarif.
pag. 194.
The Incon-
tinentia Ur-
inae cured
by the pow-
der of a
Toad burnt
alive and
hung about
the neck.

Effects ascrib-
ed to Witch-
craft Care. I
per appenda.

tio Vesicae, yet the Remedy helps her as long as she wears it about her, in case she renew the Powder, when the Vertue of it begins to decay : but that (which is remarkable to our present purpose) if she leaves it off a while, she finds the Disease return. The same *Henricus ab Hier*, among his freshly comended observations, has another of a little Lady, whom he concludes to have been cast into the strang and terrible Distemper, which he there particularly Records by Witchcraft. Upon so severe an examination of the Symptoms made by himself, in his own House, that if, notwithstanding his solemn Professions of veracity, he misrelate them not, I cannot but wonder he should confidently impute so prodigious a disease to some supernatural cause. But though the Observation, with its various circumstances be very well worth your perusing; yet that, for which I here take notice of it, is, what he adds about the end of it, concerning his having cured her, after he had in despair of her Recovery sent her back to her Parents, by an outward Medicine, namely, an Ointment which he found extoll'd against pains produc'd by Witchcraft, in a Dutch Book of *Carrichter's*: (where also I remember I met with it, set down a little differing from what he delivers) Of which wonderful Ointment, the Ingredient that he found so extremely difficult to procure, namely, the Mistletoe of Hazel, being in *England* not so rare, but that I have more then once got it, and found, as he intimates, very green, and (what he mentions not) extremely bitter, I could wish, that those that have the opportunity would make tryal. For besides what *Carrichter* delivers & our Author relates of it, a Learned Physician d d highly commend it to the Judicious *Gregorius Horsius*. And though, if we allow it to cure bewitch'd Patients, the vertue that may be in external Remedies, will be made so much the more

con-

conspicuous ; yet supposing the diseases to be, though strange, yet but natural, we cannot but allow that there may be a wonderful efficacy in an outward remedy, since it was able, only by anointing the Joints, and those pained parts with it, to cure a radicated Disease, attended with such wonderful & horrid Symptoms. And after this it may seem but little, what else would appear a strange thing, which *Helmont* affirms of a Plaister he had, wherewith he tells us, That he safely cur'd hundreds of *Quartans*, even Autumnal, without relaps : elsewhere he saith, That he made his Plaister, for by the Circumstances I presume he means no other, of a few resolving and absterfive things; and adds, That it never fail'd him, but only that in fat Persons it succeeded more slowly. And yet in these, and the like ways of curing diseases, though approv'd, if not also commended, by eminent Physicians both Ancient and Modern, there is no sensible evacuation made of peccant Humors, which perhaps materially remain in the Body, and may, by the *Effluvia* of these Remedies, be deprived of their former Qualities, & made so far obsequious to nature, that she is able, if need be, to ease her selfe of them by Sweat, Urine, or undiscerned transpiration.

Helmont cured Quartans by a Plaister.

Helmont, de febr. cap. 14. vers. finem.

Cap. 17. in fine.

And that the peccant humors remaining for awhile materially in the Body, the disease may sometimes be removed, may appear by the Cures which we see now & then performed of Agues by suddain frights; by which no discernable evacuations is made of humors, though probably some considerable chang be thereby produced in the temper of the mass of Blood, or in the Texture of the Morbifick Matter: (as Physicians call it) As seems probable both from divers other things mention'd here and there in this Essay, & particularly from the lately recited Passage of *Helmont*, where

d d

he

*Diseases cured
by frights.*

*Observ. Cent.
2. Observ. 48.*

he takes notice of the rectifying of the peccant, and, by Nature, rejected Blood, without any sensible evacuation, upon the wearing of His Ring. I knew a Gentleman, a strong and a resolute Man, who had been long a Souldier, and attained the highest sort of Military employments; notwithstanding which, he was strangely fearful of Rats, and could not endure the sight of them: This Gentleman, having been long troubled with an obstinate *Quartan*, & travelled with it into several Countries, without being able to find any Cure for it, coming at length accidentally and suddenly into a place where a great Rat was in a corner, whence he could not flie, from the Gentleman, he furiously leap'd upon him (yet without biting him) and thereby put him into a fright, which freed him from the Ague that had long importuned him. And the experienced *Salmuth* tells us a pleasant observation, of one who was cured even of the Gout by a fright. For this man having his Feet & Hands covered with a Poultis, made of Turneps, Flower and Milk, and being left in his Chair in a low Room, was whilst his Servants were all gone into the Garden, assaulted by a Sow, who finding the door open, & invited by the smell of the Cataplasin, came to devoure it; and striving to do so, flung the sick Man and the Chair to the Ground, and put him into such a fright, that our Author tells us, That very Day his Paines decreased, and continued lessening by degrees, till at length they wholly left him, without ever returning to trouble him again, There are divers Instances that discover what great changes may be produced in the Body, without taking in any thing visibly at the Mouth. And on the other side a good Air alone doth often, in Consumptions & other diseases, perform what hath in vain been expected from the use of emptying Physick. It were to be wished that we had,

had, among our *European* Physicians, the *Physick Books* of those of *China*; for though our Doctors are much more Learned Men than theirs, yet probably their Writings and their Practise may teach us something that is new, & something making for our present purpose. For the famous Jesuite *Semedo* informs us, That the Books of our Physicians having not yet been brought to *China*, they are instructed in their Art by abundance of their own Writers; and that though in their practise they do not let Blood (as the Learned *Varenius* tells us, That neither do the *Japonian* Doctors) or set Cupping-glasses, though they use no Syrrups, nor Potions, nor any Issues, but are Herbarists, using nothing but Herbs, Roots, Fruits, Seeds, &c. yet *Physick* (to use our Authors Words) *is in a very good condition in China*. (as *Almeida* also tells us, That the Physicians are much esteemed in *Japan*) And of the skill of some of the *Chineses* in that Art, he gives us in the same Chapter some considerable Instances. And though, as we said it is very likely that their Doctors are much inferior, in point of Learning to ours, yet it is considerable, that in so vast, so civiliz'd, and so populous a Country, Physick can be practised with reputation, without the use of those Evacuations, which are here so frequently made in Phlebotomy, Potions and Issues. Nor should we only expect some improvement to the *Therapeutical* part of Physick, from the writings of so ingenious People as the *Chineses*; but probably the knowledge of Physicians might be not inconsiderably increased, if Men were a little more curious to take notice of the Observations & Experiments, suggested partly by the practise of Midwives, Barbers, old Women, Empricks, and the rest of that illiterate crew, that presume to meddle with Physick among our selves; & partly by the *Indians* & other barba-

Physick now in China is in a good condition with Phlebotomy Potions or Issues. History of China. part. 1. chap. 12.

[N. B.]

Medicine facienda medicum habent peritiam. A. gr. sassa, acria, & plura proponunt, dicente Masco, pisces & conchyliis Pharmacis suavia & odorata. [N.B.] Sanguinem nunquam eliciunt, Magnam Medicorum dignitatem videre est ex Apistola Almeida ubi narrat, &c. Bern. Varenius, in Descript. Regni Japon. Cap. 25.

Where Pra-
 ctitioners of
 Physick are il-
 literate the
 Specificks
 may be best
 met with.

rous Nations, without excepting the People of such part of Europe it self, where the generality of Men is so illiterate & poor, as to live without Physitians. For where Physick is practised by Persons that never studied the Art of it in Schools or Books, many things are wont to be rashly done, which though perhaps prejudicial, or even fatal to those on whom they are tryed, may afford very good Hints to a Learned and Judicious Observer: Besides, where the Practitioners of Physick are altogether illiterate, there oftentimes Specificks may be best met with. For such Persons, being wont, for want of skil in Physick, & particularly the Art of mixing Simples, and in that of varying their Remedies according to Circumstances, do almost wholly rely upon Specificks; whose Virtues, from their practise, may be sometimes better gathered, than from that of skilful Physitians, in regard that those empiricks (besides, that they assist not with any skil in the *Methodus medendi* the virtues of their Remedies) are wont, for the Reasons newly mention'd, to try obstinately, and to the uttermost, the effects of their few specificks. And the nature of their Medicines may be the better known, in regard they are not wont to blend them, as Learned Men but too often do, with many other ingredients, whose mixture, as we formerly noted, either alters their nature, or makes it difficult to determin (as *Galen* himselfe in a like case confesseth, *Nū ut utrū fateamur hęc difficilis quoq; res est & rara inventu cū post multa remedia adhibita egrotanti quod ex iis in causa fuisse dicitur ut melius pejusve habeat*) whether the effect be ascribed to what is given for the specifick, or to some other of the Ingredients, or to the whole Compound as such: The experienced *Bontius*, in his excellent little Tract *De Medicina Indorum*, doth more than once confess, That it is very undeservedly that
 the

Gal: in Aphor.
 Hipp. Com-
 men. 1.
 The Usefulness
 of the Knowledge
 of the Medi-
 cines of Bar-
 barous Na-
 tions.

the Europeans look upon the East Indians as Barbarians. And even of those among them, that are ignorant of other things, he hath this Passage, *Hinc etiā sit quod homines ceteris rebus idiotæ tū exactū herbarum & stirpium nanciſcantur ſcientiam ut ſi vel Doctiſſimus Pawius, noſtri ævi Botanicorum princeps, è mortuis reſurgens huc veniret, miraretur ſe ab hiſce hominibus barbaris doceri poſſe.* And Linchoſten in his Voyages, ſpeaking of that Famous Mart of the East Indies, the City of Goa, where the Vice-roy and the Arch-Biſhop reſided, & he himſelf lived: Theſe heatheniſh Phyſitians (ſaith he, mentioning thoſe of Goa) do not only cure their own Nation and Country-men, but even the Portugals alſo; for even the Vice-roy himſelf, the Arch-Biſhop, and all the monks & fryers, do put more truſt in them than in their own Country-men, whereby they get great ſtore of Money, and are much honored & eſteemed. I have not now the leiſure to acquaint you with what I might alledge, to confirme this truth out of the practiſes of the illiterate Natives of ſome not yet ſufficiently civiliz'd parts of Ireland, and the Inhabitants of ſome other places where Phyſitians have not yet ſetled: But I ſhall mind you of the Confeſſion of Celfus, where ſpeaking of Phyſick, *Hæc nuſquam* (ſaith he) *non eſt: ſiquidē etiā imperitiſſimæ gentes herbas aliaq; prompta in auxilium vulnerum morborumq; noverunt.* And I wiſh that other Learned men would imitate the commendable example not only of *Proſper Alpinus*, who writ a Treatiſe *De Medicinâ Egyptiorum*; and of *Jacobus Bontius*, in his *Medicina Indorum*, but of *Gulielmus Piſo*, who hath lately preſented the World with the rude way of curing, uſed by the Braſilians themſelves, in his new and curious Books *De Medicina Braſilienſi*, in the beginning of the ſecond of which, he much confirms what we have been delivering, in the enſuing

Lib. 2. Dia-
log. 7.Voyage. chap.
34.Preface Lib.
1.

Pis de Medic:
E. ff. Lib. 2.
Cap. 1. . 1.

ing Passage : *Quemadmodum multa in tam crassa Barbarie cruda vel corrupta arteq; Hippocratica indigna reperiuntur, sic etiam non pauca utilissima antiquitatem redolentia : quæ vel eruditissimos medicos ad urnas medicinae subjiciunt, observanda occurrunt. Quippe cum mulsarum Artium rudimenta vel ab ipsis Animantibus brutis (quibus benigna mater Natura arte instita imprimis curandis morbis destitui noluit) ad nos reducere fatendū sit, Quis dubitet ab his mortalibus, licet remotissimis à dogmatica & rationali medendi arte, non p'urima nobilissima at secreta remedia atq; antidota, medendi morbos veteribus incognitos quotidie ad posteros derivari? quibus paulatim ad manū traditis & tandem quæ in succum & sanguinē à rationalibus conversis doctorum scholæ & libri superbiunt? And to this agrees very well that grave saying of our experienc'd Harvey, to the very Learned Doctor Ent: *Nulla gens tam Barbara est quæ non aut fortuitò, aut inevitabili quadam necessitate coacta, aliquid in usum communem adinvenerit quod Nationes alias humaniores latuit.* Nor should we disdain the Remedies of such illiterate People, only because of their being unacquainted with our Theory of Physick. For though I will not say, as the old Empricks wittily enough did in that Passage of Celsus, *Requirere etiam, ratio idem doceat quod experientia, an aliud? Si idem supervacuum esse, si aliud etiam contrariū.* But least we should, by too great reliance on the Galenical, or other ancient Opinions neglect useful Remedies, because present by Persons that ignore them, & perhaps too, hold Opinions contrary to them, I shal leave you to consider what is in the Person of the same empirical sect, represented by Celsus, where having spoken of the darkness of the causes of Things, & the uncertainty of the Theorems of physick: *Ac nihil istas cogitationes* (saith he) *ad Medecinam pertinere, eo quoq; disci, quod qui diversa* de*

Georg. Entin
Epistol. prefix:
Exercit. Har-
vei de Gen:
Animal.

de his senserint ad eandem tamen sanitatem homines perduxerint. Id enim fecisse, quia non ab obscuris causis neq; a naturalibus actionibus, quæ apud eos diversa erant; sed ab Experimentis, prout cuiq; respondeant, medendi vias traxerint, ne inter initia quidem ab istis questionibus deductam esse medicinam sed ab Experimentis, &c. For though this Sentence ascribes too little to reason, yet there is something in it that deserves to be considered: Especially since we observe not that the late Anatomical Discoveries of the motion of the Chyle and Limphatick Liquor, by formerly unknown ways, in newly detected Vessels, hath yet made Men cure Diseases much better than before. Not that I think that Anatomical and pathological Discoveries will not, in process of time (when the *Historia facti* shall be fully and indisputably made out, and the Theories thereby suggested, clearly established) highly conduce to the improvement of the Therapeutical part of physick; but yet this Observation may make it the more reasonable to beware of relying so much upon the yet disputable opinions of physicians, as to despise all practices, though usually successful, that agree not with them: For of such our Author speaks well, *in omnibus ejusmodi cogitationibus in utramq; partem diffusi posse, itaq; ingenium & facundiam vincere: morbos autem non eloquentiam sed remediis curari; quæ si quis elinguis usu discreta bene norit, hunc aliquanto majorem medicum futurum quam si, sine usu, linguam suam excoluerit.* And Paracelsus spoke well too, if he spoke truly, when in one of his prefaces, speaking to those whom he invited to hear him expound his Books of physick & Chyrurgery at *Basel*, *Illos tamen* (saith he of his formerly mentioned Books) *non aliorum more ex Hypocrate aut Galeno, aut quibuslibet emendicatus, sed quos summa rerum doctrina, experientia atq; labore assequutus sum, proinde si quid probaturus*

Celsi præfatio-
ne ad Lib. 1.

A Comparison
of the Em-
pirick part of
Physick with
the Rationali

rus

rus experimenta, ac ratio, auctororum loco mihi suffragantur.
 It would, *Pyrophylus*, I fear, be tedious to trouble you here with all that I have met with in good Authors applicable to my present subject, & the Design I have been prosecuting in favour of external remedies: But yet one Passage there is, which doth so notably confirm what we have deliver'd, as well touching the Efficacy of simple Medicines, as the great cures that may, in divers cases, be perform'd by outward Applications, that I must not here omit the mentioning of it, as I find the Epistle written out of *Pern* to be the inquisitive *Monardes*, in these words: *In urbe Pesto, ubi aliquot annis vixi, omnis generis morbos Indus quidam curabat solo cujusdam Plantæ succo artubus & parti affectæ illito. Aegros deinde stragulis egregiè tegebat ad sudorem provocandum: Sudor è partibus illitis emanans, mernus sanguis erat, quam lineis pannis abstergebat, atq; ita in curatione peribat, donec satis sudasse putaret, optimis interea cibis eos alens. Eo Remedio multi morbi deplorati curabantur, imò ægri juniores & robustiores ab ejus usu fieri videbantur, sed neq; pretio, neq; precibus, neq; minis unquam efficere potuimus, ut eam plantam nobis demonstraret,*

Petrus de Osma in Epist. ad Manard. in libello de simplicibus medicamentis ex Occidentali India delatis.

CHAP. XI.

Of other extraordinary Medicines which work by Magnetisme, Transplantation, &c.

BUT, *Pyrophylus*, besides such external Medicines as work after the manner of those I have heretofore mention'd, we may possibly without absurdity, provided we do it without credulity, enquire, Whether there may yet be a sort of others that operate, in a more wonderful & extraordinary way? And it would not perhaps be altogether unworthy the Experiment, to try whether or no, there may not sometimes be performed, such cures as are wont

Physitian very great thanks for the advice; the Patient having since the use of the Powder, been eas'd of the distinct pain he was put to by the Ulcers, and this relief lasted, if I misremember not, above a Year, and how much longer I know not. But I shall not insist either upon this, or upon the Testimonies, and Relations of *Paracelsus*, *Helmont*, *Göclenius*, *Burgravius*, nor even the modern Roman doctor *Servinus*, nor any of the other Authors, that do professedly take upon them the defence of the Weapon-Salve, by reason of what we have elsewhere to write to you, by way of Examination of that Salve, & the Sympatherick Powder, though I deny not in some Trials, I have found them available; Yet besides what I have newly related, I have seen sometimes something follow upon the use of Sympatherick Powder, that did incline me to think, that sometimes it might work Cures. But I shall alledge something of more unexpected credit, and first *Dominicus Panarolo* now possessor of Physick at *Rome* in his newly divulged *Fasciculus Arcanorum* presents us two instances to our present purpose, in these words. *Mira* (saies he) *quotidie reperiuntur in Medicina ad confirmationem operis quod Doctissimus Physicus, Petrus Servinus* (the same we lately mentioned) *complevit de unguento armario, sciendum est, quod petia sanguine imbuta sub cineribus calidis posita menses sistit experimento pluries comprobato: quin etiā Magister meus Petrus Castellus* (whose name his late Anatomy of the Civet Cat, and other Writings have made Famous) *asebat se expertum fuisse Hemorrhoides, si tangeretur tuberosa radice Chondrilla, siccari, si Chondrilla sicceetur; corrumpi vero si corrumpatur: quapropter sub Camino exsiccanda ponitur, post hujusmodi tactum Chondrilla tuberosa.* The Learned *Salmuth* in his Observations furnishes us with an Example of a most violent pain of the Arme, removed by

Transf.

The effects of
Weapon-Salve
& other Mag-
neticall Re-
medies.

Panarola
Fasc. Arcan. 1.

Centur. 3. Obs.
Nat. 34.

Transplantation: They did beat up Red Corals with Oaken leaves, & having kept them on the part affected, till suppuration; they did in the Morning put this mixture into an Hole bored with an Auger in the Root of an Oak, respecting the East, and stop't up this Hole with a Peg, made of the same Tree; from thencefore the pain did altogether cease, & when they took out the Amulet, immediatly the torments returned sharper then before. A great and excellent Lady (a near Kinsman, *Pyrophilus*, of yours & mine) & very far from credulous, confess'd to me, as did her servants also, that with the above mention'd Remedie of Ashes and Urine, she was not only once cured of the Yellow Jaundice, by a friend of hers that had observed, that she had been fruitlessly vexed by a Tedious course of Physick, prescribed by the famousst Doctor then in *England*; but that afterwards, relapsing into that same disease, she had cur'd her self by the same Remedy. I remember, that being some years since brought almost to the brink of the Grave by a sudden effusion of Blood within my Body, from which, without a signal mercy of God, I should not have recovered; among other men skilled in Physick that came to assist me, in that danger, I was visited by a Galenist of much repute, whose pale looks inviting me to enquire what it was that ailed him, he answered me, That he had not long before been desperately sick of an obstinate *Marasmus*, which notwithstanding all the Remedies he could use, did daily so consume him, that he appeared but a Skeleton, whereupon having found the uneffectualness of ordinary Remedies, & being hopeless of being releived by them, he resolv'd to try a Sympathetick Medicine, which I remember my self to have met with in *Hartman*. He took then an Egge, and having boiled it hard in his own warm Urine, he with a Bod-

kin perforated the shell in many places, and then buried it in an Ant-hill, where it was left to be devoured by the *Emmets*, and as they wasted the Egge, he found his distemper to lessen, and his strength to encrease, insomuch that he now conceived his Disease to have quite left him.

Observations
of the Trans-
plantation of
Diseases.
River. Cent. 4.
Observ. 63.

The Experienc'd *Riverius* in his last Observations (newly published since his death) has two notable Examples to our present purpose. For first, he tells us, that the eldest Daughter of a great Officer in *France*, was so tormented with a *Paronychia* for four daies together, that the pain made her pass the night sleepless; whereupon having by *Riverius* his order, put her Finger into a Cats Eare, within two hours she was deliver'd from her pain, and her whole hand, which before was Tumid, unswell'd again; except the finger, which it self was out of Pain. The other case was of a Counsellors

River. Cent. 4.
Observ. 19.

Wife, who by the same Remedy was cured of a *Panaritium* (which had for four daies vex'd her) in a much shorter time then the other, namely within a quarter of an Hour. But that which chiefly makes these stories pertinent to our present occasion, is this notable Circumstance, that in both the cases, the Cat was so manifestly put to pain that *Riverius* thought it had attracted to it self the morbidick matter frō which it freed the Patient; For in the former of these in two cases, the Cat loudly complain'd of the pain he felt, & the other, was, in that short time the cure was performing, put to so much pain in his Eare, that two men were hardly able to hold him fast, he struggl'd so forcibly. And these too relations of *Riverius*, may, though there be some disparity in the cases, give some countenance to what might

In Historiar.
Cent. 3. Observ. 3.
Medicophyl.
Cent. 3. Ob-
serv. 28.

otherwise be distrusted in the Observations of the Industrious *Petrus Borellus*, where he saies, *Podagra mirè levatur, si catelli cum podagrigo recumbant, morbum enim contrahunt adeo*

adeo ut vix incedere queant ; Ager verò levamen suscipit. Which perhaps he may have been induced to write by the story that goes of, that odd Chymist, *Robert Fludd's* having transplanted the Gout of one of his Patients, by a making him often sleep with a Dog that was fond of him, who thereby became afterwards subject to such periodical fits of the Gout, as the Master had been troubled with.

[And since I begun this Chapter, and met with these Objections, discoursing of this matter with a judicious person, well skill'd in Physick, and whom his learned Writings have made Eminent, He told me, that he had not very many Months since, seen a Cure by Transplantation, perform'd on the Son of one that was wont to make Chymicall Vessels for me : and because the Observation is considerable, that there might be no mistake in it, he has pleas'd to set it me down in writing (attested with his annexed name) which enables me to present it you in his own words: N.N. of *N. Potter*, had a Son, who was long sick of the Kings Evil, which swell'd much, and broke into sores at last, which he could by no ordinary means heal. The old Man had then a Dog, which took an use of licking the soares, which the Dog continued so long, till he wasted the very kernels of Ulcers that were knit in with the veins, and perfectly cur'd the sore, but had the swelling transplanted to himself, so that he had thereupon a great swelling, that arose and continued on his Throat. The Lad was thereby freed, so continued to be till 1660, & for ought I know, is so this day. This I saw being there at that time to view the Clays, and bespeak Retorts of the old man *]

* Some years since the present ESSAY was written, I lighted on the 66 Observ. of the industrious Bartholinus 3 Cent. and the 53 Obser. of his 6 Cent: in both which places giving instances of the Transplantation of Diseases he mentions, besides some of those Examples delivered by us, divers others; for which I am willing to refer you to the alleged places only in the list of these Observations delivering something at upon his own knowledge (which he does not in the rest of the instances) that much confirms what we have mentioned concerning Fludd: We shall annex it in his own words. In

Carello Milefio Avi nostri materni, quem jam alit in ædibus suis Avunculus meus suscipiendus *M. Jacobus Fijnckius Phys. P.P. & Academiæ nostræ senior*, evidentius hæc paruit trahendi facultas. Colico dolore torquebatur Avunculus, Canis ventri impositus quum incalisset, urgebatur exitum, ronuic vehementer & Tormina colica Avunculi remiserunt. Ancilla ejusdem in dolere duntium eundem canem genis apposuit, sensisque levamen, sed canis colorum impatentia hinc inde cursitare & latrare. Idem expertus est scriba in Colli Tumore,

And

Centur. X.
Exp. 997.

And to confirm the credibility, as well as increase the number, of our magnetical waies of cures; I shall adde, That *Sr Francis Bacon* himself Records, with great solemnity, his own having been freed, not only from very many new warts, but from one almost as old as he, by a piece of Lard with the skin on it, which after having rub'd upon them, was expos'd out a of Southern Window to putrefie. And therefore though the vanity and superstition of the Authors that speak of Magnetick Remedies, & the impertinent circumstances, that are usually prescribed, as necessary to their effectualness, do generally, & justly enough, make sober men despise, or at least suspect such unlikely waies of cures; yet in consideration of instances lately produced (to which we may perhaps elsewhere adde some others) and because divers men, as well Physitians as others, have seriously assured me of their having been some of them eye-witnesses, and others performers of such cures; I am apt to think it fit, that, a severe indeed, but yet further trial be made of Physical Experiments of this kind. And I cannot but commend the curiosity of *Dr Harvey*, who, as rigid a Naturalist as he is, scrupled not often to try the Experiment mention'd by *Helmont*, of curing some Tumors or Excrescencies, by holding on them for a pretty while (that the cold might thoroughly penetrate) the hand of a man dead of a lingering disease; which Experiment, the Doctor was not since pleas'd to tell me, he had sometimes try'd fruitlessly, but often with good success. Nor doth the grand Objection against such Experiments, namely, that such or such a person, having once made trial of them, found them not succeed, seem at all to me, alone, of weight enough to make such Experiments, or those other improbable ones formerly mention'd, totally reject'd. Because, that if they really do

do sometimes succeed, though sometimes they chance to fail, yet that possibility of their succeeding may sufficiently evince, that there are really in Nature Medicines that work after that extraordinary manner. And I see no reason, why it should be more required of those Medicines, that work at distance from the Patient (or at least are not taken at Mouth, or injected elsewhere) only by subtle *Effluvia*, that they should always cure, then it is exacted of vulgar Remedies, from which we might reasonably expect more constant effects, because of their being either inwardly given, or more immediately, or at least, more durably applied to the Patient. And if *Rubarb* be justly affirmed to be an excellent medicine in *Loosenesses*, though we daily in *Ireland* see many swept away of those diseases, in spite of the use of *Rubarb* & *Mirabolans*, with other astringent Remedies to boot: And if quicksilver be, not unreasonably, by most of our Physicians, esteemed and employed as an effectual Remedy against Venereal Diseases, because it sometimes removes them, though *Fernelius*, *Montanus*, and many other Learned Authors tell us, as they say upon their own experience, that (though it often palliate those distempers) it very seldom cures them: Nay, and if *Diaphoreticks* are still esteemed such by the generality of Physicians, though few *Sudorificks* will cause sweat in all bodies, and scarce any in some bodies, I see not, why these Remedies, that work, as it were, by *Emanation*, may not deserve the name of Medicines. if they sometimes unquestionably succeed, though they should not always prove successful ones; Nor why they should, notwithstanding their sometimes not succeeding, be laid aside, especially since these sympathetic ways of cure are most of them so safe & innocent, that, though, if they be real, they may do much good, if they prove

The sometimes not succeeding of Magnetical medicines no sufficient cause to abandon their use.

prove fictions they can do no harm, (unless by accident, as in case the Patient should so singly rely on them, as to neglect (which he need not all) other helps to recover.)

CHAP. XII.

BUT you will now perhaps demand, *Pyrophilus*, how the Naturalist, as such, can contribute to the Credit or Advancement of the mentioned ways of curing diseases, without the wonted weakning and painful Evacuations? In answer to this Question, I must put you in mind, That it would be no new thing for Naturalists, not professedly Physitians, to treat of this subject; and that the Naturalist may afford good Hints to the practitioner of Physick, both upon divers other accounts already touch'd upon, and by trying upon Bruits variety of hitherto untried Medicaments or Remedies, and by suggesting to him both the Events of such Tryals, and also what hath been already observed about the cures of Diseases incident to Beasts. For though (as we formerly told you) there are some things that are not equally Poysonous, as others not equally Safe, to Man and to *some* Bruits; yet there are other Beasts, especially Dogs and Monkeyes, whose Bodies are, by many Poysons, affected almost like those of Men: And since according to the Rule, *Periculum faciendum est in vili animâ*, many things may be very well tryed on such Creatures, that we dare not at first venture to try on Men. We may give Dogs Poysons, only to try the Vertue of our Antidotes; and we may give them Wounds, to make tryal of the efficacy of the Weapon-salve and Sympathetick Powder: Since divers of my Friends (as I have intimated above) assure me, That they have some of them seen, and others performed cures of Horses, lam'd by pricking,

by

*Instances of
divers Cures
upon Bruits,
and how these
are applicable
to Men.*

by sticking the Nails that hurt them into Weapon-salves which for that very use, among others, some of them are wont to carry about them in Silver Boxes. When Oxen, and such like Cattle, are troubled with that Disease which makes them continually turn about in one place (and is therefore called the *Turning Evil*, or *Sturdy*) a common Remedy here in *England*, as Graiers that make use of it inform me, is to cast down and tie fast the sick Beast, and then to open his Skull a good way (or, if need be, take off a round peice of it over the place supposed to be affected) and at the open place to take out a little Bag or Bladder, which is usually found to lye near the Membrances of the Brain, and to be full of Water and Blood, and then leisurely to heal up the hurt : And this cure is much commended, as both common and easie, by our experienced *Markham*. In Goates likewise, that are much subject to the Dropsie, the Husband-man ventures to slit, and let out the Water under the Shoulder. And divers hazardous Operations in Chirurgery, such as are Arteriotomy, the Exsection of the Spleen and other parts, were, or should have been first attempted upon Bruits, & then practised on humane Bodies. And in imitation of these, 'tis likely that divers other Experiments, of good use in Chirurgery, may be discovered for the relief of Man, without endangering him in prosecuting such Discoveries. And to say nothing of the known practice of spaying swine & bitches; In the neighbourhood of a Country house of mine, in the West of *England*, & probably in divers other parts, some experienced Shepherds have an odd way of castrating male Sheep, especially Lambs when they are grown so old that 'tis thought dangerous to geld them the common way. A Servant of mine that deals much in Cattle, and had lately divers Sheep swigg'd (as they call it) after this manner, tells me that its thus done: the Beast, on whom the Operation is to be performed, being

F f

held

held by a strong Man with his Belly upwards , another Man draws a string , as firmly as he can (tying it with a knot or two, to prevent its yielding or slipping off) about the Testicles, as if he meant, by drawing that string, to cut them off; and then anointing the part with a little fresh Butter , or some such like thing , he lets the Ram goe to feed; which for the most part (notwithstanding the anguish of this Ligature) he will begin to do in a short time: And within two or three days, the Testicles, being, by the strict Ligature , denied the Nutriment and Spirits that were wont to be conveyed to them, will grow so rotten as either, together with the string, to fall off, or be very easily pul'd off, sometimes stinking very rankly like Carrion. And even among those things that are already practised by Farriers, Shepherds and Graziers, there are many such things as we have newly mentioned , which may serve either to enrich or illustrate the way of curing humane Bodies: Their ignorance and credulousness , together with the liberty and meanness of those Creatures they physick, gives them leave to venture on any thing , having made them try upon Horses and Cattle, many such things as Physitians dare not try upon Men and Women. And among those many extravagant things, some , as it often happens, have succeeded so prosperously, as to deserve to be considered by the skilfullest Physitians; Some of whom might, without disparagement to their profession, do it an usefull piece of service, if they would be pleased to collect and digest all the approved Experiments and Practices of the Farriers, Graziers, Butchers, and the like , which the Ancients did not despise, but honoured with the Titles of *Hippiatrica* and *Veterinaria* : And among which , if I had leisure, divers things may be taken notice of, which might serve to illustrate the *Methodus medendi*. As to give you but one Instance which lately occurred to me, The Usefulness

fulness of letting Blood in some cases, Which is so severely condemned by many Chymists, and the efficacy of a small, if seasonable, Evacuation, which can scarce be conceiv'd to do more than alter the course of the Blood, may be illustrated by the Staggers in Horses, and the Cure of it. For I have seen a Coach-horse, ready to drop down dead of his Disease upon the High-way, by having his Gums rubb'd with the Coach-whip till the Blood appear'd, relieved almost in a moment so much, that though he were not well able to stand before, yet he was immediately able to go on, and draw the Coach with his fellows.

CHAP. XIII.

THe next thing we are to observe to you, *Pyrophylus*; and on which its nature and importance will engage us somewhat long to insist, is this; That the Handling of Physical matters was Anciently thought to belong to the Naturalist; as we are clearly informed by the judicious *Celsus*, in that memorable Passage, where speaking of the Origin of Physick, *Primo* (saies he) *medendi scientia Sapientia pars habebatur; ut morborum curatio & rerum natura contemplatio sub iisdem Authoribus nata sit: Scilicet his hanc maxime requirentibus, qui corporum suorum robora, inquieta cogitatione nocturna; vigilia, minuerant.* He adds, that many of the Professors of philosophy, especially *Pythagoras*, *Empedocles*, and *Democritus*, and that *Hippocrates* (whom some think to be the disciple of the last nam'd) was the first that sever'd physick from philosophy, and made it a distinct discipline. And this Apologie for the ensuing discourse being thus premised to it, I shall farther Answer, that I should perhaps be obliged to exceed the limits of an

E S S A Y, if I should in this Discourse insist on every thing, upon whose account the Naturalist may assist the

F f 2

Physician

That the handling of Physical matters was anciently thought to belong to the Naturalist. Celsus in Praefatione Lib. 1.

Physitian, if he be barely a *Medicus* to cure Diseases, which that you may the more readily believe, I shall select & prosecute some of these things in the remaining part of this ESSAY.

But the rejecting Specificks because they make no visible evacuation is irrational.

And first I shall represent to you on this subject, That the account upon which Physitians are wont to reject, if not, deride the use of such Specificks, as seem to work after a secret and unknown manner, and not by visibly Evacuating peccant humours (or by other supposedly manifest qualities) being generally this. That they see not how the promis'd Effects can well be produced by Bodies, that must work after so peculiar and undiscerned a manner; This being, I say, the great thing that hinders Physitians from endeavouring to find, or, so much as, being willing to make use of Remedies of this sort, the Naturalists may do much towards the removal of this Impediment, by shewing out of such things as may be met with or performed within the Macrocosme, That such, or at least as strange operations as are ascrib'd to these Specificks, are not without Example in Nature; and consequently ought not to be rejected, barely as being impossible. And indeed the Physiologie, wherewith Physitians as well as others are wont to be imbu'd in the Schools, has done many of them no small Disservice, by accustoming them to grosse apprehensions of Natures ways of working. Whence it comes to passe, that not a few ev'n Learned Doctors will never expect, that any great matter should be performed in Diseases, by such Remedies as are neither obvious to the sense, nor Evacuate any grosse, or at least sensible matter. Whereas, very great alterations may be wrought in a Body, especially if Liquid, as is the Blood and peccant Humour, without the Ingresse or Egresse of any visible matter, by the intestine commotion

tion of the parts of the same body acting upon another, and thereby acquiring a differing Motion, Location (if I may so speak) or Figure, which, with the other Qualities and Effects resulting thence, may alter the motion and Texture of the Liquor, and thereby produce great changes in the Body that Harbours it. How much an unperceiv'd recess of a few subtile Parts of a Liquor may alter the Nature of it, may be guess'd at, by the obvious change of Wine into Vineger; wherein upon the Avolation (or perhaps but the misplacing) of so little of the Spirituous and Sulphureous part, that it's Presence, Absence, or new Combination with the other Parts is not discernable to the Eye, the scarce decreased Liquor, becomes of a quite differing Nature from what it was And though in *England* this Degeneration be not wont to be so suddenly perform'd by reason of the coldness of the Climate, yet in hotter Countries the change is much more speedily made. As in *Brazil*, the above mentioned *Piso* informes us, that the expressed Juice of the Sugar Canes, which by Coddion, and farther ordering, would be certainly brought to Sugar, will of it selfe keep sweet but about four and twenty Houres, and then begin to sower, and be altogether unfit to make Sugar of, though very fit to turn into good Vineger. And this I find confirm'd by a Modern and applauded *French* Writer in his Description, of some parts of the West *Indies*, inhabited by his Nation: And relations of the same sort, concerning the hasty sowing of some other Liquors in *America*, I have had from our *English* Travellers and Planters. And in the East-*Indies*, *Linschoten* tels us of a change much more suddain: For speaking of the formerly mention'd *Sura* or Liquor, afforded by the wounded *Coco tree*. The same water (says he) standing but one Houre in the

That great changes may be made only misplacing without any Evacuation of the parts.

Lib. 4. cap. 10.

The making of Vineger is an Instance of this truth especially in the Indies.

chap. 56.
Sunne

Sunne is very good Vineger, and in *India* they have none other. And that even very hurtful Liquors (and why not then some peccant matter in the body) may after the like

See Pife. l. 1. manner change their Nature, may appear by what we have formerly mentioned, and is unanimously affirm'd by credible Writers of several Nations, concerning the juice of *Mandioca*, which, being poyson, when it is first express'd, does in a few hours by Fermentation, purge it selfe and loose its pernicious Nature. That also by the bare Ingresse of some Subtile and not visible Matter, such intestine Commotions may be excited in Liquors, may appear by the sowing which has been often observed upon great Thunders to happen, not only to wines, but to other Vinous Liquors also, as I lately received from a great Master of variety of Liquors, a complaint that by some Thunder, which happen'd here a few weeks since, almost all the Beer and Ale in the neighbourhood was spoyl'd. And I remember, that when I return'd out of *Italy* thorow *Geneva*, there happen'd in that place an Earthquake, upon which, the Citizens complained, that much of their wine was sowr'd, though I that lodg'd in the highest part of the Town, saw nothing to make me believe, that the bare Succession of the Earth was capable to produce so great and suddain an alteration in the Wine.

Divers Instances to prove that invisible corpuscles may passe from Amulets and cause great alterations in the Juices of a mans Body.

That such invisible Corpuscles may pass from *Amulets*, or other external Remedies into the Blood and Humors, and there produce great changes, will scarce seem improbable to him that considers how perspirable according to *Hippocrates* a living body is, and that a Vegetable and Animal Body's, whose Texture is more loose and open, may well be supposed to send forth Expirations, since even divers Minerals are found to do the like; as may appear by the odorable steames of rub'd Brimstone, and Amber, by the Corpuscles, which performe the Magnetick Operations

tions, by the Emetick Quality imparted to Liquors by the Glasse of Antimony, and by *Crocus Metallorum* barely infus'd in them, without sensibly loosing any thing, either of their bulk or weight; and by the vertue of killing Wormes, wherewith Wine, and even Water has been, not only by *Helmont*, but by divers other Physitians, observed to be enrich'd, after a Quantity of *Quicksilver* has been for some Houres shaken in it, though without any sensible deperdition of the substance of the *Mercury*. And indeed I have somewhat wondred that many Learned modern Physitians, either out of an affected Severity, or perhaps Animosity against Chymists, overlook or even deride all operations of this Nature; Since I remember *Galen* himself, not only confirms the like doctrine, by his reasons and Authority, but delivers a very strang Example of it; for, under the Title of *Glychysda*, treating of *Peony*, He thus Discourses, *Est præterea omnino rescicatoria: Ea propter haud desperaverim eam ex collo pueri suspensam merito Comitiale morbum sanare. Equidem vidi puellum quandoq; octo totis mensibus morbo Comitiali liberum, ac postea fortuna cum quod à collo suspensum erat decidisset, protinus demum convulsione correptum; rursusq; suspensum in locum illius alio, inculpate postea egisse, Porro visum est mihi satius esse rursus id collo detrahere, certioris experientia gratia: id cum secissem, ac puer iterum esset convulsus, magnam recentis radiceis partem ex collo ejus suspendimus, ac deinceps prorsum sanus effectus est puer, nec postea convulsus est. Rationabile itaque erat, aut partes quaspiam à radice defluentes, ac deinde per inspirationem attractas, affectos ita locos curare, aut Aerem à radice assidue mutari & alterari. Nam hoc pacto *Suæus Cyrenæicus* collumellam phlegmone affectum juvat & *Melanthion* frictum palam *Catarrhos* & *Coryzas* desiccat, Si quis id in calidum linteum, rorum, liget assidueq; calorem ex eo per inspirationem in nares attrahat. Quin etiam si pluribus*

De simp. Med. de Jaculati- bus Libro 6^o

Galen's Example of this Cure Root, &c.

linis

linis, & maxime marina purpure, collo viperæ injectis, illis viperam praefoces, eaq; postea cujuspiam collo obvincias, mirifice profueris tum Paristhmiis tum omnibus iis quæ in collo expullulant. Nay, that such invisible Bodies, by passing through grosser ones, and thereby changing the Motion and *nexus* or Juncture of their parts, may produce lasting alterations in the Textures (though it be a Paradox) seems not at all to me impossible. For we find the most fluid Body of Quicksilver *has been* some times, (I say sometimes) and therefore *may*, without sensible increase of Bulk, be coagulated by a Metalline Exhalation so, as to be cut like Lead, and to retain that solidity, till by some Art or other it be reduc'd to its pristine Fluidness. You may be inclin'd to think, that the hard and solid Body of Iron has a permanent alteration made in it's Texture, if you hold a needle during a competent time near the Pole of a Vigorous Loadstone without touching it. For the Magnetical *Effluvia* (as may very probably be conceiv'd) will so dispose the parts of the nearest extrem of the Needle, as that they shall admit the steames that come from one of the Poles of the Load-stone, and not those that come from the other: whereas by skilfully holding it to the contrary Pole of the same Stone, the internal Pores, and consequently the Texture of the Needle, will presently be quite otherwise disposed, in reference to the Magnetical *Effluvia*; as we more fully declare in another ESSAY where we shall, I suppose, also perswade you, that the Effects of the Load-stone are performed by subtil Bodies issuing from, or passing through it. What we have in a former discourse told you concerning our having at Pleasure changed the Poles of a Load-stone, by help of the Magnetica *Effluvia* of the Earth, may let you see that in Stones, also such alterations are possible to be made. And in the next ESSAY

save

save one, we shall give you another Instance pertinent to our purpose. For if you heat a slender piece of Steel (as a Graver, or the like) red hot, and suffer it to cool leisurely in the Air, it will continue flexible enough, and of so soft a Texture, that you may easily make impressions on it, with any hardned Steel: but if, instead of cooling it thus slowly, you knock it into such a dry body, as we shall there name to you, it will immediately grow so hard, as to be brittle. Which alteration, whether it be resolved to proceed from the particular *Effluvia* of the Body, into which it is knocked, or barely from the ingresse of the Corpuscles of Cold; (if any such there be) it will be however an Instance not unfit for our purpose. And those, *Pyrophylus*, that are conversant in Glass-houses, may easily observe, that Glass acquires a more or less brittle Texture, according as (to speak in the Glass-mens language) it is baked. For if after glasses are blown, they be quickly carried into the open Air, they wont to be much more subject to break, than those, that after they are fashion'd, are plac'd in a kind of very long Oven (which is wont to be built over the Furnace, wherein the materials, whereof the Glass is made, are kept in Fusion) & are by slow degrees refrigerated, and not 'till after some houres exposed to the open Air: For whether this difference of Brittleness, & consequently of texture, be ascribed to the interrupted Transcurfion of some Ethereal matter, through the Pores of the Glasse, or to the insinuations of the Atoms of the Cold; or to this, that the Particles of the Glasse agitated by the heat, were surpriz'd by the Cold before they could make an end of those Motions which were requisite to their disposing themselves into the most durable Texture, it is evident enough, that 'tis by no gross or visible Body, that this permanent difference of Texture is produced. Of the like to which we may elsewhere give you Examples in some other Concretes. That also in an human Body, great alterations may be made by very subtil *Effluvia*,

*Of Purging
by the Order
of Poisons.*

gg

appears

Cent. 3. Ob.
ser. 4.Cent. 3. Ob.
ser. 8.

Lib. 3. cap. 9.

Of the purg-
ing & Vomiting
Quality of the
Air of the
mountain Pa-
riacaca 243.
244.

appeares evidently, not only by the instances we have formerly given of the efficacy of some outwardly applyed Remedies, but by divers other things; as that many are purged by the bare Odor of Potions, of which I have been assured upon his own Observation by the experienced Town Phisitian of *Plimmouth Dr. D.* And of which *Salmuth* in his Observations, gives us an instance in a young Gentlewoman, whom he saw more happily purged, by the Odor of a Potion, drunk by her Sister, than she was that took the Medicine. And the same Author tels us, of one *Dr. Pseil* an eminent Phisitian, who was wont, when he had a mind to be Purged, to goe into some Apothecaries shop, where Electuaries electively purging were preparing, to which having a while smelt, they would by their Odor, after his return home, work with him six or seven times, as if he had swallowed the Medicine it selfe. And *Henricus ab Heer*, in the twenty ninth of his formerly commended Observations, tels us, Of a Woman that not only was wont to be copiously purg'd by drinking Bief-broth, but having by a fall broken her Leg, us'd no other Cathartick, than the bare Odor of that sort of Broth. And very Observable to our purpose, is the operation of the Air, all along the ridg of the high mountain in *Pernu*, called *Pariacaca*, of which the Learned Jesuite *Joseph Acosta* relates, That though he went as well prepared as he could, to withstand the Operations usually produc'd in Travails, by that piercing Air, yet when he approached to the top of the Mountain, he was (notwithstanding all his Provision) surpriz'd with such fits, and pangs, of striving and casting, as he thought he should cast up his Heart too; Having after meat, Phlegme, and Choler, both yellow and green, in the end with over striving cast up Blood; and continued thus sick for three or four houres, 'till he had passed into a more temperate Air than that of the top of the Mountain; which runs about 500 Leagues, and has every where, though not equally, this discomposing

discomposing property , having operated upon some of his companions , as well downwards as upwards. A greater proof of the power of the Steams upon the Body may be taken from the propagation of Infectious Diseases, which being conveyed by insensible *Effluvia*, from a sick into a healthy Body, are able to disorder the whole OEconomy of it , and act those sad Tragedies, which Physitians do so often unsuccessfully endeavour to hinder. But you will cease to doubt, that Corpuscles, though so small as to be below the sense, should be able to perform great matters upon humane Bodies; if you consider what alterations may be therein produced by the bare actions of the parts upon one another. This may appear by the effects of several Passions of the mind, which are often excited by the bare, if attentive, thoughts of absent things. In obstinate grief & Melancholy, there is that alteration made in the disposition of the Heart, and perhaps some other parts by which the Blood is to Circulate, that the lively motion of that liquor is thereby disturbed, and obstructions and other not easily remov'd distempers are occasion'd. The bare remembrance of a loathsome Potion, does oftentimes produce in me (& I doubt not, but the like thought may have the like Operation in many others) a Horror, attended with a very sensible Commotion of divers parts of my Body, especially with a kind of conclusive motion, in or about the Stomack. And what power the Passions have to alter and determine the course of the Blood, may appear yet more manifestly in modest and bashful persons, especially Women, when meerely upon the remembrance or thought of an unchast, or undecent thing, mentioned before them, the motion of the Blood will be so determin'd, as to passe suddenly and plentifully enough into the Cheeks (and sometimes other parts) to make them immediatly wear that livery of Vertue (as an Old Philosopher styl'd it) which we call a Blush. And even by joy, if great and sudden, I not long since

The power of Steams seen in the Infectious Effluvia.

Of alterations made by the Passions of Mind.

saw in persons of both Sexes, not only the cheeks and Fore-head, but it left (as to the Lady) even the neck and Shoulders Died of that Colour. And that Passions, may not only alter the Motion of the Juices of the Body, but likewise make some separation and evacuation of them, may appear in grief, which is wont, especially in Women to make all the Commotions requisite to weeping: whereby oftentimes a considerable quantity of Briny Liquor is excluded at the Eyes, under the form of Tears, by which divers (especially Hysterical) Persons are wont to find themselves much refreshed, though with some it fares otherwise in teeming Women. Also that vehement desire we call Longing, may well be supposed to produce great alterations in the Body of the Mother, which leaves such strange and lasting impressions upon that of the Infant; since 'tis the Mother only, and not at all the Infant, that conceives those importunate desires.

CHAP. XIV.

Divers Instances of the power of Imagination,

THere are many Instances to be met with in Physicians Books, to shew that Imagination is able so to alter the Imagining person's Body, as to work such a disposition in the Spirits, Blood and Humors of it, as to produce the determinate Disease that is excessively feared. And I remember, that soon after the last Fair Lady R. Died of the Small Pox, I chanced to meet one of her Sisters with her Mask on amongst some other Persons of High Quality, and wondering to see her sit Maskt in such Company, her Husband (who was present) told me, That his Wife having been happily brought to Bed some while before her Sister fell sick; he had carefully kept the knowledge of her sickness from his Wife; least the kindness that was betwixt them two might prejudice her in the condition she was in, but that after, a while a Lady unawares making mention in her hearing

ing of her Sisters sickness, she immediately fancied that she should have it too, and accordingly fell sick of that disfiguring Disease, whose Marks obliged her for a while to were a Mask. Nor is it in Women only, but even in Men, that conceit may produce such real and lasting effects. For many authentick Histories record examples of those, in whom excessive Grief or Fear has made such a change in the Colour of their Hair in a Night, as Nature would otherwise have scarce made in divers Years. And I remember, that being about four or six Years since, in the County of *Cork*, there was an *Irish* Captain, a man of middle Age and Stature, who coming with some of his followers to render himself to your Uncle *Brogbill*, who then commanded the English Forces in those parts upon a publick profer of pardon to the *Irish* that would then lay down Armes, he was casually, in a suspicious Place, met with by a party of the *English* and intercepted. And my Brother being then absent, upon a designe, he was so apprehensive of being put to Death, by the inferiour officers, before your Uncles return, that that Anxiety of mind quickly changed the Colour of his Hair after a peculiar manner: of which I (being then at that Castle of your Unkles whereunto he was brought) had quickly notice given me, and had the Curiosity to examine this Captain, and found that the Hair of his Head, had not (as in the instances I had met with in Histories) uniformly changed its Colour, but that here and there certain peculiar Tufts and locks of it, whose Bases might be about an inch in Diameter were thus suddenly turned White all over: the rest of his Hair (of which you know the *Irish* use to were good store) retaining it's former Reddish Colour.

An Instance
of the hair of
Head chang'd
in colour upon
a sudden
Fears.

[You will mistake my design, *Pyrophylus*, if you conclude from what I have said, concerning the Power of *Effluvia* to work upon the Body, that I am either so much an *Helmontian* as to condemn the Use of all those Remedies that make
such

such more grosse Evacuations (if I may so call them) as are made by Vomit, Seige, & the like; or that I would have you, or am my selfe so credulous, as to believe all the Vertues that are, ev'n by Eminent Writers, ascribed to the remedies called Specificks: For (to mention here but this) we have observed, that the hopes built upon ev'n excellent Specificks, unlesse they be of such a resolving and absterfiv Nature, as to be able to make way for themselves into the Recesses of the Body, are oftentimes disappointed, where some Emetick or Cathartick Remedy has not been first us'd to free the Stomack and Guts from those viscus Humours, which obstructing the first passages much enervate the Vertue of the Remedy, if they doe not altogether deny it access to the innermost parts of the Body. That then which I aim at, is first to keep you from being prejudiced by the Confidence of some Larned Doctors, who laugh at the very name of Specificks, and will not allow any Disease to be curable, but by visible Evacuations of store of what they call peccant Matter; And next to give you cause to think that such Specificks, as men of judgment and credit do recommend upon their own Experience ought not to be rejected without Trial, upon the bare account of their not being either Laxative or Vomitive, Sudorifick, or Diuretical; Nay, nor so much as for this, that they are not endow'd with any Eminent Degree of any manifest Quality, such as Heat, Cold, Driness, Odor, Taste, Astringion and the like; nor able perchance to work any considerable alteration in a healthy Humane Body. For I consider the Body of a living man, not as a rude heap of Limbs and Liquors, but as an Engine consisting of several parts so set together, that there is a strange and conspiring communication betwixt them; by vertue whereof, a very weak and inconsiderable Impression of adventitious matter upon some one part may be able to work on some other distant part, or perhaps on the whole Engine,

How the Authors discourses concerning the power of Effluvia ought to be understood.

Engine, a change far exceeding what the same adventitious Body could do upon a Body not so contriv'd. The faint motion of a man's little Finger upon a small piece of Iron that were no part of an Engin, would produce no considerable Effect; but when a Musket is ready to be shot off, then such a Motion being applied to the Trigger by vertue of the contrivance of the Engine, the Spring is immediatly let loose, the Cock falls down, and knocks the flint against the Steel, opens the Pan, strikes Fire upon the Powder in it, which by the Touch-hole Fires the Powder in the Barrel, and that with great noise throws out the ponderous Leaden bullet with violence enough to kill a Man at Seven or Eight hundred Foot distance. And that also the Engine of an Humane Body is so fram'd, as to be capable of receiving great alterations from seemingly slight impressions of outward Objects, upon the bare account of its particular contrivance, may appear by several instances beside those which may belong to this Argument in the foregoing part of this ESSAY. When a man goes suddenly out into the Sun, it often happens, that those beames which light upon his Head, and would not so short a time have any discernible effect on the least Hair of it, do almost in a moment produce that strange and violent motion in the head and almost all the Body, which we call Sneezing. Men that from the top of some Pinacle, or other high and steep place do look down to the bottome of it are at first very apt by the bare prospect, (which yet convey's nothing into the Body but those images, if yet there intervene corporeal ones in sensation of visible Objects that enter at the Eye) to become so giddy, that they are reduced to turne away their Eyes from the Præcipice for fear of not being able to stand upon their Leggs. And many that look'd fixedly upon a Whirle poole, or upon a very swift stream have had such a Vertiginous Motion thereby impressed on their Spirits, that they have been unable to keep

That the particular State or Disposition of the Engine of an humane body is considerable as to the Effects of these Impressions.

keep their Bodies upright, but have fallen into the Water they gazed on. And it is no less remarkable, that when a man is somewhat discompos'd at Sea, and yet not enough to Vomit freely ; the Seamen are wont to advise him to look from the side of the Ship upon the Water, which seeming swiftly to pass by the Vessel, has upon the gazer the operation of a rapid stream, and by making him giddy hastens and facilitates his Vomiting, as I have sometimes tried upon my selfe when I had a mind for healths sake to be put into a fit of Sea-Sickness. If a person be very Ticklish and you but gently stroke the Sole of his Foot with the top of a Feather, that languid Impression on the bottome of the foot, shall, whether he will or no, put all those Muscles and other parts into motion, which are requisite to make that noise, and to exhibite that shape of the Face (so farre distant from the feet) which we call Laughing ; and so the gentle Motion of a straw tickling the Nostrils is able to excite Sneezing. Most men may observe in themselves, that there are some such noises as those made by the grating of an ungrea'd Cart-wheel upon the *Axle-tree*, or the tearing of course Paper, which are capable of setting the Teeth on edge, which yet cannot be done without exciting a peculiar Motion in several parts of the Head. I had a servant, who sometimes complain'd to me of a much more remarkable and unfrequent disorder; namely, that when he was put to whet a Knife, that stridulous Motion of the Air was wont to make his Gummies bleed. *Henricus ab Heer* (in his Twenty ninth Observation) Records a Story of a Lady, to whom he was sent for, who upon the hearing of the sound of a Bell, or any loud noise, though Singing, would fall into fits of Sounding, which was scarce distinguishable from Death, and we may confirme that this disposition depended upon the Texture of her Body in reference to Material sounds by what he subjoyns, that hav'ng well purg'd her, and giving her for two Months

Months the *Spaw*-waters, and other appropriate Remedies he thoroughly cur'd her. And it often enough happens, that when a Woman is in a fit of the *Mother*, another Hysterical person standing by, is by reason of a peculiar Disposition of her Body, soon infected with the like strange discomposure. And to shew you, that a distemper'd Body is both an Engine, and also an Engine disposed to receive alterations from such Impressions as will make none on a sound body, let me put you in mind that those subtile Steames that wander through the Air before considerable changes of Weather disclose themselves, are wont to be painfully felt by many sickly Persons, and more constantly by men that have had great Bruises or Wounds in the parts that have been so hurt; though neither are healthy men at all incommodated thereby, nor do those themselves that have been hurt, feel any thing in those sound parts, whose Tone or Texture has not been alter'd or enfeebld by outward violence. I have known several also (and the thing is obvious) whose body's and Humours are so fram'd and constituted, that if (as men commonly speak) they ride backward in a Coach, that Motion will make them giddy, and force them to vomit. And it is very ordinary for Hysterical Women to fall into such Fits as counterfeit Epilepsies, Convulsions, and I know not what violent distempers by the bare smell of Musk and Amber, and other strong perfumes, whose steames are yet so farre from having great, much lesse *jacob* Effects in other Humane body's that almost all men, and the generallity ev'n of healthy Women are not affected by them, unless with some innocent delight. And that even on men, Odours (how minute and invisible bodies soever) may sometimes have very great power, may be gathered from the story told us by *Sacutus Lucitanus*, of a Fisherman, who having spent all his life at Sea, and being grown Old there, and coming to gaze upon a solemne reception, made in a Maritime Towne, to *Sebastian King of Portugal*,

H h

tugal,

*In Pr. Med.
adm. lib. 3. Obs.
servat. 99.*

tugal, was, by the perfumes plentifully Burnt , to welcome the King, immediatly cast upon the ground thereby into a Fit, which two Physitians judg'd Apople&ical , and Physick'd him accordingly, 'till three days after the Kings cheife Physitian, *Thomas à Vega*, gueſſing at the cauſe of the diſeaſe, commanded him to be remov'd to the Sea ſide and cover'd with Sea Weeds, where, within four Houres, the Maritime Air and ſteamers began to open his Eyes , and made him know thoſe that were about him, and within not many Dayes reſtor'd him to health. We may alſo conjecture how much the alteration produced in the Body by ſickneſs may diſpoſe it to receive ſtrong Impreſſions from things that would not otherwiſe much affect it, by this, That even a man in perfect health , and who is wont to Drink cold without the leaſt harm, may, when he has much heated himſelfe by exerciſe, be caſt by a draught of cold Drink into ſuch ſudden , formidable, and dangerous diſtempers, as, did not dayly Experience convince us, we ſhould ſcarce think poſſible to be produc'd in a Body , free from Morbid Humours, by ſo familiar a thing as a cup of ſmall beer or water; inſomuch that *Benivenius* relates a Story of one, who after too vehement exerciſe Drinking a Glaſſe of very cold Water fell into a ſwoun, that was quickly ſucceeded by Death. And yet , to adde that on this occaſion, in Bodies otherwiſe diſpos'd a large draught of cold Water, Drunk even without thirſt, may very much relieve the Drinker , and prevent great fits of the Mother , and partly of the Spleen, eſpecially upon ſuddain frights, to which purpoſes I know ſome Hyſterical Ladies that find in this Remedy, as themſelves aſſure me, more advantage than one would eaſily imagine.

And (further) to ſhew you that the Engine we are ſpeaking of is alterable , as well for the better as for the worſe, by ſuch Motions of outward Bodies, as, in themſelves conſider'd, are languid, or at leaſt may ſeem deſpicable
or

or in reference to sickness or recovery; Let me call upon you to consider a few, not unobvious, things, which may also serve to confirme some part of what has hitherto been deliver'd.

[The true Moss growing upon a Humane Skull, though I do not find Experience warrant all the strange things some Chymical Writers attribute to it for the stanching of Blood, yet I deny not, but in some Bodies it does it wonderfull enough. *The Effects of the Moss growing on humane Skull in stanching Blood.* And I very well know an Eminent *Virtuoso* who has assur'd me, as his Physitian likewise has done, that he finds the Effects of this Moss so considerable upon himselfe, that after having been let Blood, his Arme falling to Bleed again, and he apprehending the consequences of it, his Physitian, who chanc'd to be present, put a little of the above-mention'd Moss into his hand, which barely held there, did, to the Patients wonder, stanch his Blood, and gave him the curiosity to lay it out of his hand, to try whether the Moss were the cause of the Bloods so odly stopping its course, whereupon his Arme, after a little while, beginning to Bleed afresh, he took the Moss again into his hand, and thereby presently stanch'd his Bleeding the second time: and, if I misremember not, he added, that he repeated the Experiment once more with the like success. The smoak of burnt feathers, or Tobacco blown upon the face of an Hysterical Woman, does oftentimes almost as suddenly recover them out of Fits of the Mother, as the odour of perfumes did cast them there-into.] *Burnt feathers or the Smoak of Tobacco removed Hysterical fits.*

And now I speak of Cures performable by fumes, it brings into my mind, that a friend of yours and mine, and a Person of geat Veracity professes to have strangely cur'd Dysenteries by a way usually enough, which is to make the Patient sit over a Chair or Stool close on the sides, and perforated below, so that the *Anus* and the neighbouring parts may be expos'd to the fumes of Ginger, which must be thrown upon a Pan of Embers, plac'd just under the Patient,

Cures of Dysenteries by Fumes.

H h 2

who

who is to continue in that posture, and to receive the Fume as long as he can endure it without too much fainting. And when I mention'd one of the Cures that was thus perform'd, to one that is look'd upon as a Master of Chymical *Arcana* against Diseases; he prefer'd before it (as he saies upon experience) the shavings of Harts-horne us'd after the same manner, and the Remedy seems not irrational. But if in this distemper, the Actual heat applied to the abovemention'd part of the Body concur not to the Effect, we may too, warrantably enough, adde, that Cures may be perform'd by far more minute corpuscles than those of smoak, insinuating themselves from without into the Body. For I know a very dextrous Goldsmith, who, when he over heats himselfe, as he often unawares does at hammering of Plate, is subject to fall into Gripings of the Belly, which lead to Fluxes; but his usual and ready Cure is, as soon as conveniently he can, to heat his Anvil, and sit upon it for a great while together, heating it hot again if there be need. But to return to our Medicinal Smoaks, 'tis known that some find more good against the Fits of the Colick, the Glysters of the Smoak of *Tobacco*, than by any other Physick they take; so that I know wealthy persons, that relying upon the benefit they find by this Remedy, have left off sending for their Physicians to ease them of the Colick. And indeed, when I consider what an odde Concrete, even common Soot is, and that many Concretes, by being resolv'd into Smoak, may be either more or otherwise unlock'd, then they would be by the Stomack of a Man (so that I may elsewhere entertain you of the great heightning of some Emetick and Cathartick Simples in their operation, by their being reduc'd into Smoak,) and that also probably the Operation of some Fumes and Odours may be much chang'd & improv'd by their not getting into the Body by the Mouth, but other parts; I am inclinable to think that there might be made further use of them, if Physicians

*And by sitting
on a hot Anvil.*

*Cures of the
Colick by Glysters
of the
Smoak of Tobacco*

*Of other Cures
done by
Smoaks.*

ficians pleas'd, than hitherto has been. For I have made such trial of the Vertue of Sulphureous Smoak, to preserve some Liquors, as I was much pleas'd with. And not only *Paracelsus*, but *Helmont* highly extol, as a grand Specifick in fits of the Mother, the Smoak of the Warts that grow upon the Legs of Horses, convey'd to the parts suppos'd to be primarily affected. And I remember, that lately I met with a Gentleman curious and intelligent, who, as himsele assur'd me, was by the Scurvy and ill condition'd Ulcers, and other obstinate distempers brought so low, that he was scarce able to turn himsele freely in his Bed, and thereupon resolv'd against taking any more Physick, partly out of despair of recovery, and partly of weariness of the tedious courses of Physick the Doctors had in vain made him passe thorow: But that some of his Friends bringing him a certain Surgeon, whom they affirm'd to have strangely cur'd many desperate distempers, by wayes very unusual and not troublesome to the Patient, this Gentleman was content to put himsele into his Hands; the Surgeon promising that he would not give him any other Physick, but now and then a Cup of Sack by way of Cordial; his way of Cure being to fumigate the Patient very well every Morning with a certain Smoak, which that Gentleman thinks, by what he took notice of, in the Powder that yeilded it, to have been some Vegetable substance. And with this remedy in a short time he grew perfectly well, and came home a while since in very good health from a Voyage, which the confusions of his own Country invited him to make as far as the *East-Indies*. This Surgeon, whose name I cannot hit upon, dying suddenly, his secret (which was try'd upon divers others besides this gentleman) is for ought we know, dead with him.

[But as for the efficacy that may be found in appropriated Fumes and Steames. We have more than once by barely unstopping and holding under her Nose a smal Phial of highly rectified

rectified Spirit of Sal-Armoniack, or even of Harts-horn almost presently recover'd a Young Beauty, I need not name to You, out of strange Fits that were wont to take her more suddenly than those of the Falling Sickness, and were look'd upon as Epileptical, though perchance they were not meerly so. To which I shall adde, that a Lady that both You, *Pyrophilus*, and I know and love very well, though she have been long subject to violent and tedious Fits of the Head-ach, and though that distemper have been much increas'd by a great concursion of her Head, occasion'd by the overturning of a Coach, yet she is wont presently to be relieved, barely by holding her Head a pretty while over a strong decoction of *Thee*, and breathing in the Steames of it.]

Of the sudden
easing of the
Plague at
Grand Cayro
in June.

And now I am discoursing of Cures made by Steames, or other seemingly slight means, I must not permit a thing so remarkable, that if it were more generally known in *Europe*, I should think it somewhat strange to find it so little reflected on by Physitians; and that is, the constant and almost suddain easing of the Plague, how raging soever, in the almost incredibly populous City of the *Grand Cayro* in *Ægypt* towards the latter end of *June*, about which time in most Countries in our Hemisphere it is wont to spread fastest and be most rife. The truth of this is attested by so many Travellers of several Nations, that 'twere injurious to doubt of it, and not only the Dexterous Mr *R.* whom you well know, and who lived at *Cayro*, has confirm'd to me the truth of it, But the Learned *Prosper Alpinus*, who both was an excellent Physitian, and spent many Years in *Ægypt*, gives us this particular account of it, *Pestis Cayri atque in omnibus locis Ægypti invadere eos populos solet ineunte Septembri mense, usq; ad Junium: his enim omnibus mensibus, à Septembri ad Junium usq; Pestis aliunde per contagium illuc asportata eam gentem invadere solet: And after a few Lines, Junio vero mense, qualiscunque & quantacunque sit ibi Pestilentiæ, Sole pri-*

De Medicina
Ægyptiorum,
lib. 1. cap. 17.

max

nam Cancris partem ingrediente, omnino tollitur, quod multis plane divinum esse non immerito videtur: Sed quod etiam valde mirabile creditur, omnia suppellectilia, Pestifero contagio infecta, tunc nullam Contagii effectum in eam gentem edunt; ita ut tunc ea vobis in tutissimo & tranquillissimo statu reducantur, ex summe morboſo: atque morbi particulares, sporadici, à Græcis vocati, tunc apperere incipiunt, qui nusquam gentium tempore Pestis apperebant. And in the next Chapter, inquiring at large into the causes of this Wonder, he denies it to proceed from the increase of the Nile, which happens to be coincident in point of time with the extinction of the Plague, because that the Infection ceaseth before the swelling of the River is considerable; and ascribeth it rather to the alteration of the Air, produc'd by the Northernly Winds which then begin to blow, and some other Circumstances: speaking of which, *Hæc (saith he) per id temporis incipiunt observari à quibus fortasse non immerito causam extinctionis Pestis morboſiq; in salubrem statum mutationis pendere arbitror: quando nulla alia ex conservatricibus causis, quas vulgus medicorum res non naturales appellat, aëre excepto, ibi eo tempore appareat, in quam morboſi status in salubrem mutationem referre possumus: ideo necessarium erit hujusce mutationis causam Aëris mutationi acceptam referre, &c.* Upon this Instance, *Pyrophylus*, I have presum'd the longer to insist, because (if you duly reflect on it) you will, I suppose, discern, that it much credits and elucidates a great part of what hath been delivered in divers of the foregoing Leaves, concerning the possibility of Natures doing great matters against Diseases, without the help of gross and sensible Evacuations.

CHAP. XV.

*That Humane
Body may be
altered by such
Motions as
As in a Gross
and meerly
Mechanical
Manner;
prev'd by di-
vers Instan-
ces.*

AND since we have represented a humane Body as an Engine, we shall adde, that it may be altered both for the better and for the worse, by such bare motions or impulses of external Bodies, as act but in a gross and confessedly Mechanical manner: For 'tis known, that out of such speedily killing, unless seasonably remedy'd Distempers, as Fits of Swouning, Patients of either Sex, are often recovered without any inward Medicine, by being barely pinch'd in several places. I, that have endured great and dangerous Sickneses, have scarce ever found any so violent for the time, as that which the bare motion and smell of a ship and Sea Air hath put me into, especially in rough weather, till I was somewhat accustomed to Navigation; and yet this violent and weakening Sicknes, as it was not produced by a peccant Humor in the Body, so it was quickly removed by the Air, And Quiet of the Shore, without the help of Physick. And the like may be observed more suddenly in the newly mention'd Instances of those, in whom, the bare agitation of a Coach will produce such violent Fits of Vomiting, and such Faintness, that I have known some of them apprehend they should presently die, so the bare cessation of that discomposing motion soon relieved them. Wee see in our Stables, what operation, the currying of them carefully, hath upon our Horses. And *Helmont* somewhere tells us. That himselfe, as I remember, could by the Milk of an As, tell whether she had been that day diligently curried or no; and so considerable an alteration in Milk should me-thinks, strongly argue, that a great one is in the Blood or other Juice, of which the Blood is elaborated, and consequently in divers of the principal parts of the Body must have preceded it. But to prefer our consideration from the Bodies of Beasts to those

those of Men, 'tis remarkable what *Piso* confesseth, the illiterate *Braslian* Empericks are able to perform with Frictions, even as unskilfully as they order them: *Mira equidem*, saith he, *tum tuenda sanitatis ergo, cum in plerisque morbis sanandis, fractione & unctiōe frequenti incolæ præstant, illam frigidioribus, & chronicis, hanc in acutioribus adhibentes, Quæ remedia lubenter advenæ imitantur, & ut par est, ex legibus artis hæc & plura medendi Empiricorum genera moderantur.* And as *Galen* himself highly extols a skilfull Application of Cupping-glasses in the Colick; so in *Brasili* they find that the like Remedy is strangely successful: For *Cholera sicca*, saith our candid *Piso* in another place, *eisdem fere Remediis* (of which he had been speaking) *curatur, maximo si regioni hepatis cornu cucurbitula applicentur. De quibus merito hoc testor, quod Galenus de suis cucurbitulis, quas in Colico affectu incantamenti instr. operari tradidit.*

Hist. Nat. Med. lib. 2. cap. 5. p. 33.

Idem cap. 11.

We shall adde, for further confirmation, that notwithstanding all the horrid Symptomes that are wont to ensue upon the biting of that Poysonous Spider, the *Tarantula*, that lasting and formidable Disease, which often mocks all other Remedies, is by nothing so successfully oppos'd, as by Musick. Some determinate tune or other, which proves suitable to the particular Nature of the Patients Body, or that of the Poyson producing there such a motion, or determination of some former motion of the Spirits, or the Humors, or both; as by conducting the Spirits into the Nerves and Muscles inservient to the motion of the Limbs, doth make the Patient leap and dance till he have put himself into a Sweat that breaths out much of the virulent Matter which hath been probably fitted for expulsion, by some change wrought in its Texture or Motion, or those of the Blood, by the Musick. For if Sweat and Exercise, as such, were all that relieved him, why might not *Sudorificks*, or leaping without musick, excuse the need of *Fidlers*? which yet is

The Influence of the Cure of the biting of the Tarantula by Musick particularly modified.

Musurg. lib. 9.
cap. 4.

so great, that *Kircher* informs us, That the *Apulian* Magistrates are wont to give Stipends, at the publick charge, to such, to relieve the Poor by their playing. And not only He hath the memorable story of *Robertus Pantarus*; a *Tarantine* Nobleman, whose Disease being not known to proceed from the biting of a Spider, could by no Remedies be cured; he was at length, even upon the point of death, suddenly reliev'd, and by degrees restored to perfect health by the use of Musick: But *Epiphanius Ferdinandus*, in his accurate Observations concerning those bitten with the *Tarantula*, together with *Mathiolus*, and other Authours bear witness thereunto, by resembling Narratives. Now that a Sound (not barely as a Sound, but so modified) may powerfully operate upon the Blood and Spirits, I, who am very Musically given, have divers times observ'd in my self, upon the hearing of certain Notes. And it might be made probable, both by that which we have formerly said of the effect of skreaking upon the Teeth and Gums, and by the Dancing Fit, into which not every Musical Sound, though never so loud, but some determinate Tune is wont to put the bitten Patient. But it may be more manifestly prov'd, by the following testimony of our inquisitive Jesuite, wherein he affirms, That the Spiders themselves may, as well as those they have bitten, be made to Dance by Tunes suited to their peculiar Constitutions. *

* Ubi sanatores
qui Musica sua
hoc malitiam
publicis magi-
stratus stipen-
diis ad paupe-
rum remedium

solatiumque conduci curare consueverunt, ad curas patientium certius faciliusque accelerandas, primo ex insensu quærere solent ubi, quo loco, aut campo, aut cuius coloris *Tarantula* erat, à quo mortui ipsi sit insensui. Quo facto indicatum locum protinus, ubi frequentes numero atque omni generis *Tarantularum* genera: ad quæ mirum dictu, nunc has nunc illas saltare non secus ac duorum psalchordorum equaliter concinnatorum, personatione illa chorda, quæ similes sibi fuerint tono, & equaliter tensæ moventur, reliquæ immotæ, ita ut pro similitudine & conditione *Tarantularum* nunc has nunc illas saltare comperiunt. Cum vero per coloris *Tarantulam* quæ à patiente indicata fuerat in saltum prorumpere viderint, pro certissimo signo habent, modulum se habere verum & certum humori venenoso quæ taggyti 0770 proportionatum, & ad curandum aptissimum, quo si nantur insalibilem curæ effectum se consequi assueverunt. Kircher, Musurg. lib. 9. part. 3. cap. 4.

And

And this I the less wonder at, because *Epiphanius Ferdinandus* himself, not onely tells us of a Man of 94 Years of age, and so weak that he could not goe, unless supported by his Staff, who did, upon the hearing of Musick after he was bitten, immediately fall a dancing and capering like a Kid; & affirms, That the *Tarantula's* themselves may be brought to leap and dance at the sound of Lutes, small Drums, Bagpipes, Fiddles, &c. but challenges those that believe them not to come and try, promising them an Ocular conviction: and adds what is very memorable and pleasant, That not only Men, in whom much may be ascribed to fancy, but other Animals, being bitten, may likewise, by Musick, be reduc'd to leap or dance: for he saith, He saw a Wasp, which being bitten by a *Tarantula* whilst a Lutanist chanced to be by; the Musitian playing on his Instrument, gave them the sport of seeing both the Wasp and Spider begin to dance: annexing, That a bitten Cock did the like.

CHAP. XVI.

I Might also, *Pyrophilus*, confirm what I told you, when I said, That Sicknes may produce such an alteration in the Fabrick of the Body, as to make it capable to be very much affected, as well for the better as for the worse, by such things that would not scarce at all affect it if it were sound, from the consideration of those many and strang *idiorrhopaias* or *Peculiarities*, to be met with in some Persons in Sicknes and in Health. For though many of these differences between healthy Men, are not likely to be greater than may be observ'd between the same man when well, and himself as the Oeconomy of his Body may be dis-composed by some Distemper; yet we often see, that some Persons have the Engine of their Body so fram'd, that it is wonderfully disorder'd by such things as either work not at all on others, or

work otherwise on them : as it is common enough for Men to be hugely disturb'd, and some of them to fall into Fits of trembling and swooning, upon the sight or hearing of a Cat. And to such an affection I know a very eminent Commander obnoxious, Your late Uncle, the last Earl of *Barrymore*, a very gallant Noble Man, and who did his Country great Service in the Irish Wars, had the like apprehension for *Tansy*. I cannot see a Spider near me, without feeling a notable commotion in my Blood, though I never received harm from that sort of Creature, and have no such abhorring against Vipers, Toads, or other venomous Animals. You know an excellent Lady (marryed to a great Person that hath more then once Govern'd *Ireland*) whose Antipathy to Hony, which is much talked of in that Country, hath display'd it self upon several occasions: notwithstanding which, her experienc'd Physitian imagining that there might be something of deceit in her Aversion, took an opportunity to satisfy himself, by mixing a little Hony, with other Ingredients, of a Remedy which he applyed to a very slight and inconsiderable cut or scratch, which she chanced to get on her Foot, but he soon repented of Curiosity, upon the strange and unexpected disorder which his (in other cases innocent) Medicine produc'd, and which ceasing upon the removal of that, and application of other ordinary Remedies, satisfied him, That those Symptoms were to be imputed to the Hony, and not the bare hurt. The same excellent Lady, I remember, complained to me, That when she was troubled with Coughs, all the Vulgar, Pectoral and Pulmoniack Remedies did her no good, so that she could find relief in nothing but either the Fume of Powderd Amber, taken with convenient Hearbs in a Pipe, or that *Balsamum Sulphuris* which we have already taught you in this Essay.

[I know a Person of Quality, tall and strong made, who lately asked my Opinion, Whether, when he had need of a Vomit, he should continue to make use of *Cauphy*, in regard it wrought so violently with him: This gave me the occasion, as well as curiosity, of enquiring particularly both of Himself and his Lady, concerning this odde Operation of *Cauphy* upon him; and I was told, That an ordinary Wine-glasse full of the usual warm decoction of *Cauphy*, boyl'd in common Water, was wont, within about two hours, to prove emetick with him, and before Noon did give him eight, ten, or sometimes twelve Vomits, with so much violence, that he was less affected by the infusion of *Crocus metallorum*, or other usual emeticks, and therefore was deliberating whether he should not change *Cauphy* for some of them, though finding its Operation very certain, he had for some Years accustomed himself to take that Vomit: And that which is also remarkable in this matter, is, that he tells me, That scarce any Vomit is more troublesome to him to take, then that above-mentioned is grown of late, so that even the odour of *Cauphy*, as he passeth by *Cauphy*-houses in the Street, doth make him sick; and yet that Simple is to most men so far from being Vomitive, that it is by eminent Physitians, and in some cases not without cause, much extoll'd as a strengthner of the Stomack. And this very Gentleman, himself, used it a pretty while against the Fumes that offended his Head, without finding any Vomitive Quality at all in it.]

The Books of sober and learned Physitians, afford us Examples of divers such, and of much more strange Peculiarities, and likewise of such Persons who having desires of certain things very extravagant, and even absurd (ordinarily not only improper, but hurtful to their Distempers) have been cured by the use of them, of very dangerous and sometimes hopeless Diseases: Of which kind of Cures I may also

also elsewhere tell you what I have observed, and some credit may be brought to such Relations, by what we ordinarily see more greedily devoured (without much harm) by longing Women, and Maids troubled with the Green-sickness.

But now, *Pyrophilus*, since the Engine of an humane Body thus appears to be so fram'd, that it is capable of receiving great alterations from such unlikely things as those we have been mentioning, Why should we hastily conclude against the efficacy of *Specificks*, taken into the Body, upon the bare account of their not operating by any obvious quality, if they be recommended unto us, upon their own experience by sober and faithful Persons ? And that scarce sensible quantities of matter, having once obtained access to the mass of Blood (which is very easily done by the Circulation) may, by the contrary and swift motion, and by the Figure of the Corpuscles it consists of, give such a new and unnatural impediment or determination to the motion of the Blood, or so discompose either its Texture, or that of the Heart, Brain, Liver, Spleen, or some such principal part of the Body (as a spark of Fire reduceth a whole Barrel of Gunpowder, to obey the Laws of its motion, and become Fire too ; or as a little Leaven is able, by degrees, to turn the greatest lump of Dow into Leaven) need be manifested by nothing, but the Operations of such Poysons, as work not by any of those (which Physitians are pleased to call) *Manifest Qualities*. For though I much fear, that most of those that have written concerning Poysons, supposing that Men would rather believe then try what they relate, have allowed themselves to deliver many things more strange then true ; yet the known effects of a very small quantity of *Opium*, or of *Arsenick*, of the scarce discernable hurt made by a Vipers Tooth, and especially of the biting of a mad Dog (which sometimes, by less of his Spittle then would

That since the Body receives such alterations from such unlikely things, there is no just arguing against Specificks, because they operate not by any obvious Quality.

would weigh half a Grain , subdues a whole great Ox into the like madness, and produceth truly-wonderful Symptoms both in Mens Bodies and Beasts) are sufficient to evince what we propos'd.

And that Man's Body may be as well sometimes cured, as we see it too often compos'd, by such little proportions of Matter, may (not now to mention the questionable Vertues ascrib'd to many Antidotes) be gathered from that Experiment, so common in *Italy* and elsewhere , of curing the invenom'd biting of Scorpions, by anointing the bitten and tumid place with common Oyl, wherein store of Scorpions have been drown'd and steep'd. And a resembling Example of the Antidotal Vertue, Wherewith Nature hath enrich'd some bodies, is given us by the above-commended *Piso*, in his *Medicina Brasiliensis*, where (treating of the Antidotal Efficacy of the famous *Braslian* Herb *Nhanby*, eaten upon an empty Stomack) he adds this memorable Story; Lib. 4. c. 48. That he himself saw a *Braslian*, who having caught an over-grown Toad, and swell'd with Poyson (such a one as *Brasilians* call *CURURU*) which useth to be as big again as the *European* See the same Author, lib. 3 under the Title CURURU. Toad, and desperately venomous (which perhaps our Toads are not) he presently killed him, by dropping on his back the Juice of the Flowers & Leaves of that admirable Plant. And you may remember, that the same Authour formerly told us, in effect, that as great and salutary changes may be produced even in humane Bodies, where he relates, That he had known those that had eaten several sorts of Poyson, snatch'd, in a trice, from imminent death, by only drinking some of the Infusion of the Root he calls *Jaborandi*; and this, after I know not how many *Alexipharmaca* and *Theriacal* Antidotes had been fruitlessly administred.

You will perchance tell me, *Pyrophilus*, that these three or four last Instances are of Poysonous Distempers and their Antidotes; not of ordinary Diseases, and their Specifick Remedies.

medies. But to this I have a double Answer : and First, many of those Distempers that proceed from poyson, are really Diseases, and both call'd by that Name, and treated of, as such, by Physitians. And indeed they may well look upon them but as Diseases, exasperated by a virulent Malignity, which yet appears to be not always easily distinguishable from that of Diseases that proceed not from poyson, by this, That otherwise the Physitians of Princes and great Men, if after having considered all the inward parts of their dis-bowell'd Patients, could not so often doubt and dispute, as they do, whether or no Poyson were necessary to their death. And *Piso* (who learn'd divers of their detestable Secrets from the *Bra-silians*) relates, That some of them are so skilful in the cursed Art of tempering and allaying their Poysons, that they will often hinder them from disclosing their deleterial Nature for so long a time, that the subtle Murderers do as unsuspectedly as fatally, execute their Malice or Revenge. These Diseases indeed are wont to differ in this from Surfeits, and other resembling ordinary Diseases; that in the one, the venomous matter that produceth the disease, is at first much more small, then in the other the morbidick Matter is wont to be. But the activity of this little quantity of hostile Matter doth make it pernicious, that the Disorders it produceth in the Body, being much greater then that of ordinary Sickneses is; the cure of such Distempers is the fitter to manifest how powerfully Nature may be succour'd, by Remedies that work not by first or second Qualities, since such are able to deliver Her from Diseases heightened by a peculiar and very malignity.

To this first I shall subjoyn my new-ly discovered Passages of the former I have related concerning and of the Kings-Evil ordinary Diseases

sicks, as those produced by Poyson are by Antidotes.

You may also say, *Pyrophilus*, *But what if a recommended Specifick do not only seem unable to produce the promised Effect, but have Qualities, which according to our Notions of the nature of the Disease, seem likely to conspire with it and increase it?*

I Answer,

First, That though it is better for the Patient to be cured by a rashly and unskilfully given Medicine, then to die under the use of the most skilfully administred Physick; yet that the Physitian who looseth his Patient, after having done all that his art prescribed to save him, deserves more commendation then he that luckily chanceth to cure his Patient by an irrational course. And therefore in such a case as you put, *Pyrophilus*, I think the Physitian ought to be very well satisfied to the matter of fact, before he venture to try such a Remedy, especially if more ordinary & unsuspected means have not been employed and found ineffectual; for it is not one lucky Cure that ought to recommend to a wary Physitian the use of a Remedy, whose dangerous Quality seems obvious, whereas its vertue must be credited upon Report.

But then secondly, If the Physitian be duly satisfied of the efficacy of the Remedy, upon a competent number and variety of Patients, I suppose he may, without rashness, make use of such Remedies at least where ordinary Medicines have been already fruitlessly try'd.

CHAP. XVIII.

to wonder at my daring to say this,
offer to you Three or Four Parti-

fest to those that are inquisitive, That
Kk the

A Disquisition
concerning the
Ordinary Me-
thod of Phy-
sick.

the true Nature and causes of severall Diseases, are much less certain, and much more disputed of amongst the Doctors themselves, then those that are not inquisitive imagine: Nor is the method of curing divers particular Diseases more settled & agreed on, that depending chiefly upon the knowledg of those Causes, which, as I was saying, are controverted. 'Tis not that I am either an enemy to Method in Physick, or an Undervaluer of it; but I fear the generality of Physicians (for I intend not, nor need all along this Essay speak of them all) have as yet but an imperfect Method, & have by the narrow Principles they were taught in the Schools, been perswaded to change their Method rather to the barren principles of the *Peripatetick* School, then to the full amplitude of Nature. Nor do I find that Physicians have yet done so fit a thing, as seriously (and with the attention which the importance of the thing deserves) on the one side, to enumerate and distinguish the severall Causes, that may any whit probably be assign'd, how the *Phænomena* of that disordered state of humane Body, which we call a Disease, or its Symptoms, may be produced. And on the other side, by how many and how differing ways the *Phænomena* may be removed, or the Diseases they belong to destroy'd: And if this were analytically and carefully done, I little doubt but that Mens knowledg of the Nature and Causes of Diseases, and the ways of curing them, would be less circumscrib'd, and more effectual then now it is wont to be. And I am apt to think, that even Methodists would then find that there are divers probable, if not promising, Methods (proper to divers cases) which Ways they yet over-look: And though in a right sense it be true, that the Physician is but Natures Minister, and is to comply with Her, who aims always at the best; yet if we take them in the sense those Expressions are vulgarly used in, I may elsewhere acquaint You with my Exceptions at them, & in the mean time confess to you, That

I know not whether they have not done harm, and hindred the advancement of Physick, fascinating the mindes of Men, and keeping them from those effectual Courses, whereby they may potently *alter* the Engine of the Body; and by rectifying the motion and Texture of its Parts, both consistent and fluid, may bring Nature to their bent, and accustom Her to such convenient Courses of the Blood & other Juices, and such fit times and ways of evacuating (what is noxious or superfluous &c.) as may prevent or cure divers stubborn Diseases, more happily then the vulgar Methodists are wont to do.

And indeed, it is scarce to be expected, that till men have a better Knowledge of the Principles of Natural Philosophy, without which 'tis hard to arrive at a more comprehensive Theory of the various possible causes of Diseases, and of the contrivance and uses of the parts of the Body, the Method which supposes this Knowledge should be other then in many things defective, and in some erroneous; as I am apt to think, the vulgar method may be shewn to be, as to some particular Diseases. Of this I may perhaps elsewhere acquaint you more particularly with my suspicions, and therefore I shall now only mention the last Observation of this kind I met with, which was a Gentleman, You and I very well know, who being for some Months much troubled with a difficulty of breathing, and having been unsuccessfully treated for it by very Eminent Physitians, we at last suspected that 'twas not the Lungs, but the Nerves that serv'd to move the Diaphragme and other Organs of respiration, upon whose distemper this suppos'd *Asthma* depended, & accordingly by a taking or two of a Volatile Salt of ours, which is very friendly to the *genus Nervosum*, he was quickly freed from his troublesome distemper, which afterwards he was fully perswaded did not proceed from any stuffing up of the Lungs. To be short, how much esteem soever

we have for Method, yet since that it self and the Theories whereon men ground it, are, as to divers particular Diseases, so hotly disputed of; even among Eminent Physitians, that in many cases a man may discern more probability of the success of the Remedy, then of the truth of the received Notion of the Disease; In such abstruse cases me-thinks it were not amiss to reflect upon that reasoning of the Ancient Empericks (though on a somewhat differing occasion) which is thus somewhere expres'd by *Celsus*: *Neque se dicere consilio medicum non egere, & irrationabile Animal hanc artem posse præstare, sed has latentium rerum conjecturas ad rem non pertinere; Quia non interst, quid morbum faciat, sed quid tollat.* And as the controverted Method in the abovemention'd Diseases is not yet established or agreed on in the Schooles themselves, so divers of those that are wholly strangers to those Schools, do yet by the help of Experience and good Specificks, and the Method their Mother-wit does, according to emergencies, prompt them to take, perform such considerable cures, that *Piso* sticks not to give this Testimony to the utterly Unlearned *Brasilian* Empericks. *Interim, says*

Hist. Nat. Med. Lib. 2.
pag 23.

He, seniores & exercitiores eximii sunt Botanici, faciliq; negotio omnis generis medicamina ex undiquaq; in sylvis conquisitis conficiunt. Quæ tanta sagacitate internè & externè illos adhibere videas, præcipuè in morbis è veneno natis, ut quis illorum manibus tutius & securius se tradat, quam medicastro nostris sciolis, qui secreta quædam in umbra nata atque educata crepant perpetuo, & ob has Rationales dici volunt.

Secondly, There are divers Medicines, which though they want not some one quality or other, proper to encrease the Disease, against which they are administr'd, are yet confidently us'd by the most judicious Doctors, because that they are so enrich'd with other qualities, whereby they may do much more good then their noxious quality can do harm; as in a Malignant Fever, though the distemper be Hot, and though

though Treacle and some other Antidotal Sudorificks be hot also, yet they are usefully administred in such Diseases, because the relief they bring the Patient by oppugning the Malignity of the peccant matter, and perhaps by easing him of some of it by sweat, is more considerable then the harm they can do him, by increasing for a while his Heat.

*Instances of
some Medicines
which are con-
demn'd for
Noxious and
yet have prov'd
Useful.*

The very experienced *Bontius*, Chief Physitian to the Dutch Plantation in the East-Indies; in his *Methodus medendi Indica*, Treating of the *Spasmus*, which (though here unfrequent) he reckons among the Endemical Diseases of the Indies, commends the Use of *Quercetanus's Laudanum*, of *Phyloncum*, and principally of an extract of *Opium* and *Safron*, which he describes and much Extols; and least his Readers should scruple at so strange a prescription, he adds this memorable passage to our present purpose. *Fortassis* (saies he) *Sciulus quispiam negabit his remediis, propter vim stupificativam ac narcoticam nervisq; inimicam, esse utendum. Speciosa quidem hæc prima fronte videntur sed tamen vana sunt. Nam præterquam quod calidissima hujus Climatis temperies requirat, certissimum est in tali necessitate: sine his ægrum evadere non posse. Adde quod nos tam rite Opium hic præparamus ut vel infanti innoxie detur: & sane (ut verbo absolvam) si Opia, ta hic nobis deessent in morbis calidis his grassantibus frustra remedia adhiberemus quod etsi imperitis durum, ex progressu tamen me nihil temere dixisse patebit.*

Cap. 2.

The drinking freely, especially if the Drink be cold Water, is usually (and in most cases, nor without much reason:) strictly forbidden, as very hurtfull for the Dropsie, and yet those that frequent the *Spaa*, tell us of great cures perform'd by pouring in plenty of Waters into the patients already distended Belly; and I know a person of great Quality, and Vertue, who being by an obstinate Dropsie, besides a complication of other formidable Diseases, brought to a desperate condition, was advis'd to Drink *Tunbridg Waters*, when I

happn'd

happn'd to be there, by her very skilful Physitian : Who told me, that the Doctors having done all their Art could direct them unto in vain, she would be cur'd by Death, if she were not by these Waters: from whence (the weather proving very seasonable for that sort of Physick) she return'd in so prosperous a condition of recovery, as exacted both his and my wonder. That the Decoction of so heating a Simple as *Guajacum*, would be lookt upon by the generality of Physitians, both *Galenists* & *Chymists*, as a dangerous Medicine in Phthisical and other Consumptions, you will easily grant : and yet some eminent Physitians, and (particularly *Spaniards*) tell us of wonderful cures they have perform'd in desperate Ulcers of the Lungs, by the long use of this Decoction, notwithstanding its manifestly and troublefomely heating Quality. And I know a Physitian eminently learn'd, and much more a Methodist, then a Chymist, who assures me, that he has made trial of this unlikely way of curing Consumptions with a success that has much recommended these Paradoxical *Spaniards* to him. 'Tis also believ'd, and not without cause, by Physitians, that *Mercury* is wont to prove a great enemy to the *Genus Nervosum*, and often produces Palseys, and other distempers of the Brain in the Nerves : and yet one of the exactest and happiest Methodists I know, has confest'd to me, that *Mercurial* preparations are those which he uses the most succesfully in *Paralytical* and the like distempers of what Physitians call the *Genus nervosum*. And on this occasion, I remember that a Gentlewoman being confin'd to her Bed by a Dead Palsey, that had seiz'd on one side of her Body, a Physitian eminent for his Books and Cures, giving her a dose of a certain Preparation of *Mercury*, corrected with a little Gold, which I put into his hands for that purpose, was pleas'd to bring me word, that by the first taking of the Powder, which wrought but gently by Siege without either Vomits or Salivation, she was enabled the same

of the Use of
Guajacum for
Consumptions,
and Mercury
for Palseys.

same or the next day to quit her Bed , and walk about the Room.

Thirdly, there are many things which seem to be against reason, whilst they are barely propos'd and not prov'd, for which we afterwards discern very good reason : when experiences, having satisfied us they are really true , has both invited us, and assisted us to enquire into their causes. Of this we have elsewhere given divers not Medical Instances in our *ESSAY Concerning improbable Truths* : And I could easily enough , if I durst be tedious , give you some Medical Illustrations of the same truth. But I dare now only invite you to consider this one thing, which may be of great use to explicate many others, both in Natural Philosophy , and in Physick too, which is, That there are divers Concrets, some of them, as to Sense, *Similar* , or *Homogeneous* , whose differing parts are endow'd with very differing and sometimes contrary Qualities. And this not only appears in the Chymical Analysis of Bodies made by the fire , where the difference of what Chymists call the seperated Principles of Concretes is often very manifest and great, but ev'n in divers Bodies that have not been resolv'd by the violence of the Fire ; as is evident in *Rhubarb* taken in substance, whose subtiler parts are purging, and its terrestrial astringent : Nay, if those parts which do in much the lesse quantity concur to the constitution of the concrete do but meet with a Body dispos'd to receive their Impressions, it is very possible, that they may work more powerfully on it then the other Parts of the same Concrete, of which the Eye judgeth it altogether to consist.

*That there are
divers Con-
cretes as to sense
similar whose
different parts
have contrary
Qualities ; as
Rhubarb and
Oyl Olive.*

This I have made out to some ingenious Men, by shewing, that though Sallet Oyl be generally reputed to consist of Fat and Unctuous Particles , and therefore to be a great resister of Corrosion ; yet it contains in it sharp and piercing parts, which meeting with a disposed subject, do more powerfully

fully operate than the more purely Oleaginous ones. As we endeavoured to evince, by keeping for a short while in a gentle warmth, some pure Oyl-Olive, upon a quantity of Filings of even crude Copper: For from them the Liquor extracted an high Tincture betwixt Green and Blew, like that which such Filings would have given to Distill'd Vineger, which according to Chymists Notions obtains that Colour, by making with its Acid and Corrosive Salt a real solution of some part of the Copper, as may appear by the recoverableness of the mettall out of it. Another proof or two of the Acrimony of some of the parts of Oyl we may elsewhere give you. But now we shall rather confirme our Answer to your Question, by two or three Examples of Cures perform'd by unlikely Remedies.

Of Improbable Cures viz: of a Plurisy by a Laudanum Opium.

I went once to visit an Ingenious *Helmontian*, whom I found Sick on his Bed, and having, by the Symptomes of his Disease, discern'd it to be a *Plurisy*, I talk'd with him of seasonably opening a Veine, but he was resolv'd against it, and told me he would cure himself by a remedy, which at first seems as likely to encrease such a disease as Phlebotomy is to cure it, namely by the use of Helmonts *Laudanum Opium*, which in effect did in three or four days cure him, and since, he, without Blood letting, cur'd some others with it; which I the lesse wonder at, because of my having observ'd that *Opium* (with which unskilful men seldome tamper without danger) if duely corrected and prepared, proves sometimes a great resolver, and commonly a great Sudorifick; insomuch, that I have known it make a person copiously sweat, who often complain'd to me, that other Diaphoreticks had no such operation on him.

I have oftentimes seen Coughs strangely abated by the use of a Remedy, which I have not long since told you, how I prepare: & with which (I remember) In a pretty Child you (*Pyrophylus*) know, and who is now very well, I was so happy

as

as to repress in a few Houres a violent Cough, that threat-
 ned her with speedy Death ; and yet this Medicine has so
 eminent a saltness, that the Tongue can scarce suffer it; and
 how much the use of Salt things is by many Physitians con-
 demn'd in Coughs (and indeed in many cases not without
 Reason) I need not tell You. And with exceedingly piercing
 Essence or Spirit of Mans Blood, I have known, notwith-
 standing its being very Saline, and its manifestly heating the
 Patient, especially for the first Four or Five days, strange
 things perform'd even in a deplorable and hereditary Con-
 sumption. This, *Pyrophylus*, brings into my mind, some-
 thing, that, it may be, you will think odde, which is, that ha-
 ving had occasion to advise for a Person of high quality, with
 a very ancient Galenist, that in his own Country was look'd
 upon as almost an Oracle, and particularly in reference to
 Phthisical Consumptions, which was there a vulgar Disease;
 He confessed to me, that though his having fallen into it
 himselfe, made him very solicitous to find a cure for it; and
 though he had in his long and various practise, made trial of
 great variety of Methods and Remedies for the cure of that
 Disease, yet that with which he cur'd himselfe, & afterwards
 the generality of his chief Patients, was principally *Sulphur*
 melted and mingled in a certain proportion to make it fit to
 be taken, in a Pipe, with beaten Amber or a Cephalick Herb.
 The particular circumstances of his Method I cannot now set
 you down, not having by me the Paper wherein they were
 Noted; but, if I mistake not, the Herb, with which he
 mingl'd the Brimstone of Flower of *Sulphur*, was Coltsfoot
 or Betony; and I well remember, that what he look'd upon
 as the cheif and specifick Remedy in his way of curing, was
 the smoak of the *Sulphur*; the other ingredients being added,
 not so much for their being proper enough for the Disease, as
 their helping to fill the pipe, and thereby to allay the pun-
 gency, wherewith the Smoak, if afforded by a Pipe filld with

*Of Curing
 Coughs and
 Consumptions
 by Saline Me-
 dicines.*

*Of the Curing
 Phthisical Con-
 sumption by
 the Acid
 Smoak of Sul-
 phur.*

Brimstone alone, would be qualify'd. But yet this Sulphureous Smoak is so predominant in the Remedy, that he us'd to have a Syrrup in readines to relieve those, whom the Acrimony of the Fumes should make very sore, and perhaps blister on the one side of their Mouths, or Throats, which accident he provided for, by that cooling and healing Syrrup, without being thereby discourag'd from prosecuting the cure with the same Remedy; wherewith a person very Curious and Rich, has solemnly assur'd me, that him self has cur'd divers Consumptions, and particularly in a Lady, even in health very Lean, that he nam'd to me, as being one I then knew. Now we know that Physitians generally, and in most cases justly, forbid Acid things to those that have exulcerated or tender Lungs, and how highly Acid and piercing the Smoak of Sulphur is, the Chymists can best tell you, who, by catching it and condensing it in Glasses shap'd almost like Bells, obtain from it that very corrosive Liquor, which readily dissolves Iron, being the very same that is commonly call'd *Oleum Sulphuris per campanam*, and yet it seems that either the Theory of Consumptions is misunderstood, or that the drying quality of the Sulphureous steam, and its great power to resist putrefaction, and as it were embalm the Lungs and season the Blood, are considerable enough to account for the Harm which its Acidity may do.

Eeles are so commonly eaten by persons of both Sexes without being taken notice of for any Quality, except their Crudity, that one would scarce believe such a stinking and odious Medicine, as that of their Livers and Galls dried slowly in an Oven, should be more proper for any thing, than to make the taker Vomit; and yet *Helmont* in divers places speaks of the Medicine as if it had kept multitudes of Women from dying of hard Labour. And since him, *Panarola* in his New Observations highly extols it. And I knew a very famous Emperick, who had very few other secrets, and scarce

*The Use of
the Livers
and Galls of
Eeles in ex-
pediting the
hard Labour
of Women.*

scarce any one so great to get reputation and Money by. And I remember also, That some years since I had occasion to give it to the Wife of a very ingenious Physitian, of whom the Midwives and her Husband almost despair'd, and (as she afterwards told me her self) each Dose made her throwes (which before had left her) return, and at length she was safely delivered, she scarce knew how. But I found double the Dose prescrib'd by *Helmant*, requisite to be used at last; and that the quantity of a Wal-nut of the Powder of these Livers given in Rhenish or White-wine, and when the Stomack was most empty, was no more than such a case required.

Scorpions being Venomous Creatures, to suffocate and infuse them in Oyle, might seem the way to make it Poysonous; if experience did not assure us, that this Oyl is so far from being such, that it Cures the invenom'd bitings of *Scorpions*, which effect, now that the Physitians find it upon trial to be true, they confesse to be rational; and ascribe it, how justly I now examine not, to the attraction of the Poyson receiv'd into the Body, by that which is outwardly applied to the hurt. And *Piso* informes us that amongst the *Brazilians*, whose country is so much infested with Venomous Creatures, 'tis the most general Cure to draw out the Poyson by applying to the hurt the Beaten Body of the Beast that gave it. As likewise in *Italy*, they account the crushing of the very *Scorpion*, that has bit a Man, upon the bitten place, for a most speedy and effectual Remedy. And I remember that here in *England* the Old man, whom you have seen going about with *Vipers*, *Toades*, &c. to sell, told me that when he was dangerously bitten by a *Viper*, and all swel'd by the Poyson of it; a great part of his cure was the outward application of Venomous Creatures stamp'd 'till they were brought to a Consistence fit for that purpose.

*The unlikely
Cure of Ve-
name by Oyl
of Scorpions.*

The *Fluxes* are the general and Endemical Diseases in

Ireland, I need not tell you; and yet I remember, that having occasion to consult the ancientest and most experienced Physician of that Nation. Dr F. about the cure of it, he assur'd me, that though during his very long Practice he had found divers Remedies very prosperous, some on one sort of Patients, and some on another; Yet the Medicine he most relied on, was this. To take unsalted Butter, and boil it gently 'til a pretty part was consum'd; Skimming it diligently from time to time, whilst it stands over the fire; and of this Butter melted, to give now and then a considerable quantity, according as the Patient is able to bear it. A Remedy, which, at the first proposal, may seem more likely to put a man into a Flux, than to cure him of one. And yet the same Remedy, which he suppos'd to benefit by mitigating the sharp humours, and preserving the Entrails from their Corrosion, was afterwards much commended to me by another Ancient *Irish* Physician, who was esteemed among the Doctors the next in Eminency to him that I have named.

*And off fluxes
by fresh butter
melted.*

CHAP. XIX.

I Should not here, *Pyrophilus*, adde any thing to what I have already said above in favour of the use of even odde Specificks, but, that finding at every turn, that the main thing, which does (really or in pretence) prevail with many Learned Physicians (especially in a famous University You have visited abroad) to reject Specificks, is, That they cannot clearly conceive the distinct manner of the Specificks workings; & think it utterly improbable, that such a Medicine which must passe through Digestions in the body, and be whirl'd about with the Mass of Blood to all the parts, should, neglecting the rest, shew it selfe Friendly to the Brain (for instance) or the Kidnies, and fall upon this or that Juice or Humour rather than any other. But to this Objection which I have propos'd as plausible as I can readily make it, I shall at present but briefly offer, according to what has been hitherto discours'd, these two things.

And

And first, I would demand of these objectors a clear and satisfactory, or at least an intelligible explication of the manner of working of divers other Medicaments that doe not passe for Specificks; as how *Rhubarb* Purges Choler, and *Hellebor* Melancholly rather than other Humours, how some Medicines that have endur'd a strong fire, as *Antimonium Diaphoreticum*, and *Bezoardicum minerale* well made, are yet often times strongly Sudorifick; why the infusion of *Crocus Metallorum* or of Glasse Antimony, though it acquire no pungent, or so much as manifest tast, whereby to velicate the Palate or the Tongue, are yet violently both Vomitive and Cathartick; And how *Mercury*, which is *innocuously given in many cases* Crude to Women in labour and others, does easily acquire, besides many other more abstruse Medicinal Qualities, not only an Emetick or Purgative, but a Salvating faculty. For I confesse, that to me, even many of the vulgar Operations of common Drugs seem not to have been hitherto intelligibly explain'd by Physicians, who are yet, for ought I have observ'd, to seek for an account of the manner, how Diureticks, how Sudorificks, how Sarcoticks, and how many other familiar sorts of Medicines, which those that consider them slightly are wont to think they understand thoroughly, perform their operations. Nay, I much question, whether the generality of Physicians can yet give us a satisfactory account, why any sort of Medicine purges in general: And he that in particular will shew me, where either the Peripatetick or Galenical Schools, have intelligibly made out, why *Rhubarb* does particularly purge Choler, and *Scenna* more particularly phlegm, *erit mihi magnus Apollo*. For I see not how from those narrow & barren Principles of the four Elements, the four Humours, the four first Qualities (and the like,) Effects, far lesse abstruse than the Operations of Purging Medicines, can satisfactorily be deduc'd. Nor can I find, that any thing makes those Physicians, that are unacquainted

That it is very hard to give an intelligible Explication of the Operation of Electives and other Common Medicaments which are not Specificks.
280. 281.

quainted with the philosophy that explains things by the Motions, Sizes, and Figures of little Bodies, imagine they understand the account upon which some Medicines are Purgative, others Emetick, &c. And some purgative in some Bodies, Vomitive in other, & both purgative and Vomitive in most; but because they never attentively enquire into it.

But (which is the next thing I have to represent) if we duly make use of those fertile & comprehensive principles of philosophy, the Motions, Shapes, Magnitudes and Texture of Minute parts of Matter; it will not perhaps be more difficult to shew, at least in general, that Specificks may have such operations, as are by the judicious & experienc'd ascrib'd to them, then it will be for those that acquiesce in the vulgar principles of philosophy and physick, to render the true Reasons of the most obvious and familiar operations of Medicines. And though the same objection that is urg'd to prove, that a Specifick cannot befriend the kidneys, for example, or the Throat rather than any other parts of the Body, lies against the noxiousness of poysons to this or that determinate part; Yet experience manifests that some poysons do respect some particular part of the Body, without equally (if at all sensibly) offending the rest: and we see that *Cantharides* in a certaine Dose are noxious to the Kidnies and Bladder, Quicksilver to the Throat, and the glanduls thereabouts, *Stramonium* to the Brain, and *Opium* to the Animal Spirits and *Genus Nervosum*. And if you call to mind, what we have formerly deduced to make it out, That a Humane body is an Engine, and the Medicines operate in it as finding it so; we need not think it so strange, that there being many Strainers, if I may so call them, of differing Textures, such as the Liver, Spleen, and Kidnies, and perhaps divers local Ferments residing in particular parts, and a Masse of blood continually streaming through all the parts of the body, a Medicine may be quickly, by the blood, carried from any one part to any other

That Poysons
do respect
particular
parts and
therefore Me-
dicines may do
it.

other, and the Blood, or any Humour mingl'd with it, may be as easily carried to the Medicine, in what parts soever it be; and the Remedy thus admitted into the Masse of Blood, may, in its passage through the Strainers, be so alter'd, either by leaving some of its parts there, or by having them alter'd by the abovemention'd Ferments, or by being associated with some other Corpuscles, it may meet within its passage; whereby the Size, or Figure, or Motion of its small parts may be chang'd; or, in a word, it may by some of those many other ways, which might, if this E S S A Y were not too Prolix already, be propos'd and deduc'd, receive so great an Alteration, in reference either to some or other of the Strainers, or other firmer parts of the Body, or to the distemper'd Blood, or some other fluid and peccant matter, that it needs not seem impossible, That by that time the Medicine (crumb'd as it were in Minute Corpuscles) arrives at the *part* or *humour* to be wrought upon, it may have a notable Operation there. I mean *Part, as well as Humour*, because the Motion, Size, or Shape of the Medicinal Corpuscles in the Blood, though not by sense distinguishable from the rest of the Liquor they help to compose, may be so conveniently qualify'd, as to shape, bulk, & motion; as to restore the Strainers to their right Tone or Texture; as well as the Blood to its free and Natural course; by resolving and carrying away with them such tenacious matter, as stuff'd or choak'd up the slender passages of the Strainer, or at least straitned its pores, or vitiated their Figure; And the same Sanative Corpuscles may perchance be also fitted to stick to, & thereby to strengthen such Fibres of the Strainers, or such other firmer parts of the body, as may need congruous Corpuscles to fill up their little unsupply'd Cavities.

Meats that are Salt, and Tartareous, whilst they are whirled about in the Mass of blood, may by the other part of that Vital Liquor be so diluted and kept asunder so, as not to be offensive

General explanations of the Manner how these Operations of Specifics may proceed.

offensive to any part: When they come to be separated by the *Parenchyma* of the Kidnies, from the sweeter parts of the Blood, that did before temper and allay them; they easily, by their Saline purgency, offend the tender Ureters and Membranous Bladders of those that are troubl'd with the Stone or Strangurie. And perchance 'tis upon some such account, that *Cantharides* are more noxious to the Bladder than to other parts of the Body. And as Salt meat thus growes peculiarly offensive to the Reines and Bladder; so a Specifick, dispos'd to be dissolv'd, after a peculiar manner, may, in the Body, either preserve or acquire, as to its Minute parts, a freindly congruity to the Pores of the Kidnies, Liver, or other Strainers equally, when distemper'd; as I formerly observ'd to You, that New-milk sweetned with Sugar-candy, though it be not wont sensibly to affect any other part of the Body; nor would have sensibly affected the Kidnies themselves, had they not been disorder'd, yet after the troublesome operation of *Cantharides*, it had a very freindly effect upon the distemper'd Parts; Thus a Specifick for one Disease, may be resolv'd in the Body into Minute particles of such Figure and Motion, that being fit to stick to other Corpuscles of peccant matter, which, by their vehement agitation, or other offensive qualities discompose the Body and make it Feavourish, may allay their vehement Motion, and by altering them, as to bigness and shape, give them new and innocent qualities, instead of those noxious ones they had before.

Another Specifick may dissolve the Gross and Slimy Humours that obstruct the narrow passages of the Veines; as I have observ'd that Spirit of Harts-horn, which powerfully opens other obstructions, and resolves stuffing Phlegm in the Lungs; will also, though more slowly, resolve prepar'd Flowers of *Sulphur*, crude Copper, and divers other Bodies; and also it may, by mortifying the Acid Spirit that often-

times

times causes coagulations in the Blood , restore that Vital Liquor to its Fluidity and free Circulation , and thereby remove divers formidable Diseases, which seem to proceed from the Coagulation, or Ropiness of the Blood; and on the other side, the Minute parts of some Specificks against a contrary Disease, may somewhat thicken and fix the two thin and agitated parts of the Blood , or of some peccant matter in it , by associating themselves therewith : as the nimble parts of pure Spirits of Wine , and those of high rectify'd Spirit of Urine, will concoagulate into Corpuscles, bigger and far less Agile . And the same Spirit of Wine it selfe , with another Liquor I make , will presently concoagulate into a kind of soft , but not fluid Substance. Nor is it so hard to conceive that a Specifick may work upon a determinate part or Humour , and let the others alone : as if you put, for instance, an Egge into strong Vineger, the Liquor will operate upon, and dissolve all the hard shell, and yet leave the tender skin untouch'd; And if you cast Coral into the common rectify'd Spirit of *Tartar*, the far greater part of the Liquor, though strong and spirituous, will remain unalter'd thereby, and may be, *integris viribus*, abstracted from it; but the Coral will presently find out, or rather be found out by Acid or Acetuous Particles, and by incorporating it selfe with them, take away their sharpness : as in some cases Coral has been observ'd to do to Sower Humours abounding in Humane Bodies , those Humours being easily, by the Circulating Blood, brought (in their passage) to the Coral, whilst it perhaps remains in the Stomack or Guts. And though the circulation of the Blood be sufficient to bring little by little, the Acid Particles of that Liquor in its passages through the vessels to work upon Coral ; yet in other Medicines the Operation may be more nimble: The Remedy quickly diffusing it selfe through the Mass of Blood , to seek , as it were, and destroy the Acid parts, which it meets with blended with

*That Vineger
will operate on
the shell and
not upon the
other parts of
the Egge, with
like Instances
of Specificks
operations.*

the rest of the Liquor ; as Spirit of Urine being instead of Coral put into the above mention'd Spirit of Tartar will not (that I have observ'd) fasten it selfe to the Spirituous nor the Phlegmatick parts of the Liquor , but only to the Acid ones, which it will Mortifie or deprive of their Sowerness by concoagulating with them. And I see not why it should be more inconceivable that a Specifick should have a peculiar Vertue to free the Body from this or that peccant Humour , and a benign congruity to the distemper'd Spleen or Liver , then that some Cathartick should purge Electively, and some Antidotes have peculiar Vertues against such Poysons , whose Malignity particularly invades the Brain or kidneys, or some other determinate part: the former of which the Physitians, we reason with, scruple not to teach; and the latter of which is taught us not by them only, but by Experience too.

[Of the credibility of Specificks, and of the Efficacy even of some unlikely ones, wee might easily enough present You with more Proofs and Examples : But these may possibly be sufficient for our present purpose, especially if you duly consider , that as Physick has ow'd its beginning to Experience, so those that practise it must enlarge and rectifie their Principles according to the new discoveries, which are made from time to time of the Operations and Power of the productions whether of Nature or of Art. This consideration I thought to insist upon in my own Expreffions; but finding lately the same Notion which I had , to have been long since that of the ancient Empricks , I will summe up what I meant to say in their words, as I find them wittily deliver'd by *Celsus*, in that excellent Preface, where having spoken in their Sense of the Origin of physick, He continues *Sic Medicinam ortam, subinde aliorum salute aliorum interitu perniciosam discernentem à salutariis: Repertis deinde Medicinæ remediis, homines de rationibus eorum differere cepisse; nec post*
Rationem

That Physick as it began by Experience, so it must be enlarg'd and rectify'd by the new discoveries of Experience.

Rationem, Medicinam esse inventam, sed post inventam Medicinam, Rationem esse quaesitam. And least the mistaken name of Emperick should make you undervalue so useful a Consideration, which not the nature of their Sect, but that of the thing, suggested to them; I shall adde in favour of what we have deliver'd concerning experienced, though otherwise unlikely Remedies, that 'tis a sentence ascrib'd to *Aristotle* (and in my opinion, one of the best that is ascrib'd to him,) *Ubi res constat; si opinio adversetur rei, quarendam rationem non rem ignorandam.*]

And certainly, *Pyrophilus*, though there be scarce any sort of men, whose credulity may doe the World more mischief than that of Physicians; yet perhaps, neither nature nor mankind is much beholden to those, that too rigidly, or narrowly, circumscribe, or confine the operations of Nature, and not so much as allow themselves or others to try whether it be possible for Nature excited and manag'd by *Art* to perform divers things which *they* never yet saw done, or work by divers ways, differing from any, which by the common principles that are taught in the Schools, they are able to give a satisfactory account of.

To the many things which you may be pleased to apply to this purpose, out of the precedent Discourse, divers others may be added, if without tiring you, they may be now insisted on. It would scarce have been believed some ages since, by those that knew no other than Vegetable purges and Vomits, that a Cup made of a Concreate, insuperable by the Heat of Humane Stomacks should, by having for a while, Wine or any such other Liqueur, barely powr'd on it to make an infusion, without any sensible diminution of its own bulk or weight, and without any sensible alteration made in the Colour, Taste, or Smell of the Wine, communicate to it a strongly Emetick and Cathartick Vertue, and prove oftentimes Vomitive, ev'n when put up in the Clysters; & yet that

That the Operations of the Antimonial Cup, Gless of Antimony and Crocus Metallorum, would not have been credited in Ancient Times.

this is performable by Antimony, slightly prepared with Salt peter, or without addition, melted into a Transparent Glass, is commonly known to those that are not Strangers to the Operations of the Antimonial Cup, and of the Glass made of the same Mineral. And much more strange is that which is affirmed by inquisitive Physitians upon their own Trial of the common *Crocus Metallorum*, or somewhat corrected Antimony wont to be sold in Shops, namely, That a few Drachmes of it, infus'd into some ounces of Wine, will make the Liquor work so strongly, as if six or eight times the quantity had been steep'd in it.

Those that believe that all Diaphoreticks must consist of subtle, sapid and fugitive parts, as if only such were easily separated from each other, and agitated by the gentle heat of a Humane body, will scarce expect that any body could, in a moderate Dose, be a good Sudorifick, that is so fixt as to be able to persist divers houres in a good Fire. And yet that *Antimonium Diaphoreticum* is such a Concrete, is now very well known to many besides Chymists.

Divers other Influences a-like incredible.

That a Stone, and a Stone too so fixed, that it will sustain the violence of reverberated Fire, and is consequently very unlikely to be much wrought upon, or digested by the heat of a Humane Stomack, should be capable of agglutinating together the parts of broken bones, would seem impossible to many, but 'tis very well known to those that have made tryal of the efficacy of the *Lapis Cassiagnus*: for though I have sometimes wondred at the Fixtness of this Stone, above others, in the Fire, yet being for some days successively drunk in Wine, or *Aqua Symphyti*, to the quantity of about half a Drachme, or more, it doth so wonderfully cement together the parts of broken & well-set Bones, that it deserves the name it commonly hath in the Shops of *Osteocolla*, and hath wonders related of it by several eminent, not only Chymical, but *Galenicall* Writers.

'Tis

'Tis almost incredible what *Quercetane* relates of what himselfe saw done with it as to the cure of broken Bones, without much pain or any of the usual grievous Symptoms, within four or five days; so that to the stupendous Vertue he ascribes to this Stone, both inwardly given and outwardly applyed, in the form of a *Poultis*, with only beaten *Geranium* and Oyl of Roses or Olives, he thinks fit to annex these words: *Quod incredibile videri posset, nisi præter me innumirabiles alii oculati & idonei testes extarent.* And indeed these need good proof to make a wary Man believe so strange a thing, since Chirurgions observe, That Nature is wont to be forty days in producing a *Callus* to fasten together the pieces of a broken Bone. But to make this the more credible by the testimony of Authors more *Galenically* inclin'd, *Matthiolus* relates, That in many the Bones having been very well set (which Circumstance he requires as necessary) have had their broken Parts conglutinated within three or four days: And not only that most experienced Chirurgeon *Fabricius Hildanus* us'd it much in Fractures, with only a little Cinnamon and Sugar to make it pleasant; but the Learned *Sennertus*, who somewhere calls it Vertue admirable, thinks it requisite, in his Chirurgery, to give us this caution of it: *Verum in juvenibus & iis qui boni sunt habitus callum nimis auget: Quapropter caute & non nisi in adultioribus exhibendus:* The warrantableness of which caution, and consequently the strange efficacy of *Osteocolle*, was, I remember, confirm'd to me not long since by a skilfull Physitian who hath particularly studyed its nature; and related to me, That some Years since his Mother, having by a fall broken her Leg near the Knee, had too suddenly, by the over-much use of this Stone, a *Callus* produced in the part much bigger than he expected or desired.

He that, before the salivating Property of *Mercury* was discovered, should have told Physitians of the despondent
temper

Feb. Cent. 3.
Oblat. 90.

Lib. 5. Part. 5.
Cap. 1.

temper of these, we are now discoursing with, that besides the known ways of disburthening Nature (namely by Vomit, Siege, Urine, Sweat, and insensible Transpiration) there were a sort of Remedies, that would make very large Evacuations by Spittle, and thereby cure divers stubborn Diseases that had been found refractory to all ordinary Remedies, would certainly have been more likely to be derided than Believed by them; since no known Remedy, besides *Mercury*, hath been, that I remember, observed to work regularly by Salivation: (for though *Ceruss* of *Antimony* have been observed to make Men, of some Constitutions, apt to spit much, yet it works that way too languidly, to deserve the name of a Salivating Remedy; and probably oweth the quality it hath of enclining to spit, to the *Mercurial* part of the *Antimony*, wherewith the *Regulus* it is made of abounds) and therefore the greater their experience of the effects of Medicinal Operations should be supposed to be, the greater indisposition it would give them to credit so unalayed a Truth. And yet the reality of the Fluxing Property of Quick-silver is long since grown past question, and hath been found so usefull in the cure of the most radicated and obstinate Venereal Distempers, that I somewhat wonder those Physicians, that scruple not to employ as boysterous ways of Cure, have not yet applyed it to the extirpation of some other diseases; as Ulcers of the Kidneys, Consumptions, and even Palsies, &c. wherin I am apt to think, it may be as effectual as in those produced by Lust, and much more effectual than vulgar Remedies, provided that the exceeding troublesome way of working of salivating Medicines be better corrected than it is wont to be, in the ordinary Medicines employed to produce Salivation, which they do with such tormenting Symptomes, that they are scarcely supportable. But if purified Quick-silver be dexterously precipitated by a long and competent digestion, with a due proportion of refined

refined Gold, Experience hath informed us, that the salivating Operation of it may be performed with much less uneasiness to the Patient. And that such *Mercurial* Medicines, wherein the Quick-silver is well corrected by Gold, may produce more than ordinary effects, we have been enclined to believe, by the tryals which we procured by Learned Physicians to be made in other than Venereal Diseases, of a gently working precipitate of Gold and *Mercury*, of which we may elsewhere set you down the Process.

[And now I am upon the Discourse of the peculiar Operations of *Mercury*, and of unusual ways of Evacuation, I am tempted to subjoyn an odde Story, which may afford notable hints to a speculative Man, as it was related to me both in private, and before Illustrious Witnesses, by the formerly commended Chymist of the *French King*: He told me then a while since, that there is yet living a Person of Quality, by name *Monsieur de Vatteville*, well known by the Command he hath or had of a Regiment of *Switzers* in *France*, who, many Years agoe following the Wars in the *Low-Countries*, fell into a violent Distemper of his Eyes, which, in spite of what Physicians and Chyrurgions could do, did in a few Months so increase, that he lost the use of both his Eyes, and languish'd long in a confirm'd Blindness; which continued till he heard of a certain Emperick at *Amsterdam*, commonly known by the name of *Adrian Glas-maker* (for indeed he was a Glasier) who being cry'd up for prodigious cures he had done with a certain Powder, this Colonel resorted to him, and the Emperick having discours'd with him, undertook his recovery, if he would undergo the torment of the Cure; which the Colonel having undertaken to do, the Chyrurgion made him snuff up into each Nostril about a Grain of a certain *Mercurial* Powder, which, in a strangely violent manner, quickly wrought with him almost all imaginable ways, as by Vomit, Siege, Sweat, Urine,

*A strange
Cure of blindness
by a Mercurial powder.*

rine, Spitting and Tears, within ten or twelve houres that this Operation lasted, making his Head also to swell very much : But within three or four days after this single taking of the Drastick Medicine had done working, he began to recover some degree of Sight, and within a Fortnight attained to such a one, that he himselfe assur'd the Relater, He never was so Sharp-sighted before his Blindness. And the Relater assur'd me, that he had taken pleasure to observe, That this Gentleman, who is his familiar Acquaintance, would discern Objects farther and clearer than most other Men. He added, That *Monsieur de Vatteville* told the Relater, he had purchas'd the way of making this Powder of the Emperick, and had given it to an eminent Chirurgion, one *Benoeft* (an acquaintance of the Relaters) by whom he had been cured of a Musket shot that had broken his Thigh-bone, when the other Chirurgions would have proceeded to amputation; and that this *Benoeft* had with this Powder, administred as before is related, cur'd a Gentlewoman of a *Cancer* in the Brest. All which, and more, was confirm'd to the Relater by the Chirurgion himself. But in what other stubborn and deplorable Cases they use this Powder, I doe not particularly remember. The Preparation of it, which a Chymist did me the favour to tell me by word of mouth, as a thing himself had also made, was in short this : That the Remedy was made by precipitating Quick-silver, with good Oyl of Vitriol, and so making a *Turbith*, which is afterwards to be dulcified by abstracting twenty, or twenty five, times from it pure Spirit of Wine, of which fresh must be taken at every abstraction. But I would not advise you to recommend so furious a Powder to any, that is not a very skilful Chymist and Physitian too, till you know the exact Preparation, and particular uses of it ; the reason of my mentioning it here, being but that which I expressed at the entrance upon this Narrative.]

CHAP. XX.

YOU will perchance wonder, *Pyrophylus*, that having had
 so fair an opportunity as the subject of his Essay afforded
 me, of discoursing to you about the Universal Medicine, Of Universal
Medicines.
 which many *Paracelsians*, *Helmontians*, and other Chymists
 talk of so confidently: I have said nothing concerning the
 existence, or so much as the possibility of it. But till I be
 better satisfied about those Particulars than yet I have been,
 I am unwilling either to seem to believe what I am not yet
 convinced of, or to assert any thing, that may tend to dis-
 courage Humane Industry; and therefore I shall only ven-
 ture to adde on this occasion, That I fear we doe somewhat
 too much confine our hopes, when we think, that one ge-
 neral Remedy can scarce be effectual in several Diseases, if
 their causes be supposed to be a little differing. For, the *Theo-
ry* of Diseases is not, I fear, so accurate and certain as to
 make it fit for us to neglect the manifest or hopeful Vertues
 of noble Remedies, where ever we cannot reconcile them to
 that *Theory*. He that considers what not unfrequently hap-
 pens in distempered Bodies by the *Metastasis* of the Morbi-
 fique matter (as for instance, how that which in the Lungs
 caused a violent cough removed up to the head may pro-
 duce (as we have observed) a quick decay of Memory and
 Ratiocination, and a Palsie in the Hands and other Limbs)
 may enough discern that diseases that appear very differing,
 may easily be produced by a peccant matter of the same na-
 ture only variously determined in its operations by the con-
 stitution of the parts of the body where it settleth: and conse-
 quently it may seem probable to him, that the same search-
 ing Medicine being endowed with qualities destructive to the
 texture of the Morbifique matter, where ever it finds it, may
 be able to cure either all, or the greatest part, of the Disease

*That the same
Matter may
cause divers
Diseases*

which the various translation of such a matter hath been observed to beget. Moreover, it oftentimes happens that Diseases, that seem of a contrary nature, may proceed from the same cause variously circumstantiated; or (if you please) that of divers Diseases, that may both seem primary, the one is but Symptomatical or at most Secondary in relation to the other; as a Dropsy and a slow Feaver may, to unskilfull men, seem Diseases of a quite contrary nature, (the one being reputed a hot and dry, the other a cold and moist Distemper) though expert physicians know they may both proceed from the same Cause, and be cured by the same Remedy. And in women experience manifests, that a great variety of differing Distempers, which by unskilful physicians have been adjudg'd distinct and primary Diseases, and have been, as such, unsuccessfully dealt with by them, may really be but disguised Symptomes of the distempers of the Mother or *Genus Nervosum*; and may, by remedies reputed *Antihysterical*, be happily remov'd. To which purpose I might tell you, *Pyrophilus*, That I, not long since, knew a practitioner, that with great success us'd the same remedies (which were chiefly Volatile and Resolving Salts) in Dropsies, and in (not, Symptomatical, but) Essential Feavers. And our selves have lately made some Experiments of not much unlike nature, with a preparation of Harts-horn, of equal use in Feavers and Coughs, both of them primary. I might on this occasion recur to divers of the Remedies formerly mention'd in several places of this Essay; since divers of them have been found effectual against Diseases, which, according to our common Theory, seem to be little of kin one to another: And by telling you what I have observed concerning the various operations of *Helmont's Laudanum*, of our *Ens Veneris*, and even of a Medicine devised by a Woman, the Lady *Kents* powder, I might illustrate what I have lately delivered: But it is high time for me to pass on to another subject; and

And the same
Medicine cure
them.

and therefore I shall rather desire you, in general, to consider, whether or no several differing Diseases, and ev'n some commonly supposed to be of contrary natures, be not yearly cured by the *Spaa-waters* in *Germany*.

And to assist you in this Enquiry, I shall address you to the *rare Observations* of the famous and experienc'd *Henricus ab Heer*, and to his *Spadaerene*; in the 8th Chapter of which he reckons among the Diseases which those Waters cure, Catarrhs, and the Distempers, which (according to him) spring from thence; as the palsey, Trembling of the Joints, and other Diseases of kin to these, Convulsions, *Cephalalgia*, (I name them in the order, where I find them set down) *Hemicrania*, *Vertigo*, redness of the Eyes, of the Face, the *Erysipelata*, *Ructus continui*, *Vomitus*, *Singultus*, Obstructions, and even *Scyrhus's*, if not inveterate, of the Liver and Spleen, and the Diseases springing thence; the Yellow Jaundise, *Melancholia flatulenta seu Hypochondriaca*, Dropsies, Gravel, Ulcers of the Kidneis, and *Caruncula in meatu urinario*, *Gonorrhæas*, and resembling affections, *Elephantiasis* or the Leprosie, *fluor albus mulierum*, Cancers and *Scyrrhus's* of the Womb, Fluxes and even Dysenteries; the Worms (though very obstinate, and sometimes so copious as to be voided in his presence, even with the Urine) Sterility, and not only the *Stabies* in the Body and Neck of the Bladder, and clammy pituitous Matter collected therein, besides Ulcers in the *Sphincter* of it; but he relates, upon the repeated Testimony of an eminent person that he names, and one whom he stiles *Vir omni fide dignissimus*, That this party being troubled with a very great Stone in his Bladder, and having had it search'd by divers *Lytbotomists*, before he came to the *Spaa*, did, by very copiously drinking these Waters, find, by a second search made by those Artists, that his Stone was much deminished the first Year, and (by the same way of tryal) that it was so the second Year. And

An Instance
in the waters
of the Spaa.

of the Cures of these Diseases, the Physician mentions in the same Chapter, as to many of them, particular and remarkable Instances; and in the beginning of the next Chapter, having told his Readers that he expects they should scarce believe these Waters can have such a variety of Vertues, *Caterum, saies he, si in Spaa maturè & constantibus naturalibus, vitalibusq; facultatibus venerint; aquasq; quo dicemus modo biberint, indubiè quæ dixi vera esse fatebuntur:* And though we be not bound to believe (nor doth he affirm it) that the Spaa-waters do universally cure all the afore-mention'd distempers; yet it is very much, and makes much for our present purpose, that they should in so many Patients cure most of these distempers, and lessen, if not cure, the rest. And we may somewhat the better credit him, because even where he reckons us the Vertues of the Spaa, he denys it some, which other Physicians ascribe to it. And it is very considerable, what he subjoyns in these words: *Paucissimos enim vel nullos Spadæ Incolas Capitis doloribus, Cardialgiâ, Calculo, Obstructionibus renum, Hepatis, Lienis, Mesaraicarum, laborantes invenies; Ictericos, Hydropicos, Podagricos, scabiosos, Epilepticos, quodsciam, nullos.* But that which I most desire you to take notice of, is, That besides all the above-mention'd Diseases, I find that he ascribes to these Waters the Vertues of curing such as are counted of a contrary nature, & are thought to require contrary Remedies. For besides that, he expressly affirms, in the beginning of the eighth Chapter, That these Waters being endow'd with the Vertues both of hot and cold Minerals, they cure both hot and cold affections, in the same Patients, and in differing Bodies, and that contrary Effects are performed by them: He hath, after some Pages, this Passage, which may goe for an Illustrious proof of that he had asserted: *Inter cætera (saith he, speaking of the Spaa-Waters) Mensibus movendis imprimis idonea, quod millies experientia comprobavit*

comprobavit. Et tamen nimium eorum fluxum quovis alio medicamento fecilius sistit.

These Testimonies, *Pyrophylus*, of our experienc'd Author would perhaps obtain the more credit with You, if You had seen what I lately had the opportunity to observe in a hot and dry Season, at our own *Tunbridge-Waters* in *Kent*, when I was there to drink them. And therefore I shall again invite You not only to consider, Whether one potent Remedy, such as it may be, may not be able to cure variety of Diseases, and some suppos'd to be of contrary natures; But whether or no divers Persons, on whom the received *Methodus medendi* hath been long and fruitlessly employ'd, be not by their tyred and despondent Physicians themselves sent thither, and there cur'd of their abstruse and obstinate Diseases, by Remedies prepar'd by Nature without the assistance of Art; For if you duly reflect on this conspicuous Observation, and consider how much it is possible for Art to meliorate and improve most (especially Mineral) Remedies, afforded us by Nature, you would probably dare to hope, That Medicines might be prepared of greater Efficacy, and applicable to more diseases, than they who think the more received Theory of Diseases (from which yet very eminent Physicians, in divers Particulars, scruple not to recede) incapable of being rectified; and that judge of all Remedies by them, that are publickly Venal in Apothecaries Shops, will allow themselves so much as to hope.

If now you demand, *Pyrophylus*, if I think that every Particular which hath contributed to swell this Discourse into a bulk so disproportionate to that which the Title of an Essay promised, to directly belong to the Art of Physick I shall leave it to the Judicious *Celsus* (whom Learned Men have stiled *The Roman Hippocrates*) to answer for me, and he will tell you, That *Quaquam multa sint ad ipsas artes non pertinentia, tamen eas adjuvant excitando artificis ingenium.*

Of the reason and design of the Authors discourse concerning the Methodus medendi and his descending to other particulars which may be thought improper for Him.

I suppose I need not remind You, *Pyrophylus*, that it was not my design, in what hath been represented, to subvert those principles of the *Methodus medendi*, from which no sober Physicians themselves recede, and in which they unanimously acquiesce : And that I much less intend to countenance those venturous Empericks, who, without any competent knowledge of Anatomy, Botanicks, and the History of diseases, think Receipts or processes alone can enable them to cure the Sickneses they know not, and who would persuade Men to lay by, as needless, a profession, of whose Usefulness to Mankind we may elsewhere have occasion to discourse. No, *Pyrophylus*, without peremptorily asserting any thing, I have but barely represented the Notions I have mention'd concerning the *Methodus Medendi*, as things probable enough to deserve to be impartially considered ; That in case they prove fit to be declin'd, they may appear to have been rejected not by our superciliousness or laziness, but (after a fair tryal) by our experience: And in case they seem fit to be approved, they may prove additional Instances of the Usefulness of *Natural Philosophy* to Physick. Which Usefulness, *Pyrophylus*, if I have in any considerable measure been so happy as to make out, I shall not think the time (and much less the paines) I have bestow'd upon that Theme, mispent. For, I must confess to you, *Pyrophylus*, that to me it seems, that few things ought more to endear to us the Study of *Natural Philosophy*, than that (according to the Judicious Sentence of our *Celsus*, *Rerum Naturæ contemplatio, saith he, quamvis non faciat Medicum, aptiorem tamen Medicinæ reddit*) a deeper insight into Nature may enable Men to apply the Physiological Discoveries made by it (though some more immediatly, and some less directly) to the Advancement and Improvement of Physick.

And I well enough know, *Pyrophylus*, that if instead of Writing the Essay to such a one as You, I should Write it
to

to the more critical and severer sort of Readers, they would be apt to think both that it is impertinent for me, who do not profess to be a Physitian, to treat prolixly of Matters Medicinal ; and that it may appear somewhat below me, in a Book , whose Title seems to promise you Philosophical Matters, to insert I know not how many Receipts : But I shall not scruple to tell such a Person as *Pyrophylus* , That since my Method requir'd that I should say something to you of the *Therapeutical* part of Physick, I thought that Christianity & Humanity it selfe, oblig'd me not to conceal those things, which how despicable soever they may seem to a speculative Philosopher, are yet such , as, besides that *some* of them may perhaps afford improveable Hints touching the Nature of Remedies, if not also of Diseases, Experience hath encouraged me to hope, that *others* may prove useful to the sick. And as for the inserting of Receipts, even in Books of Philosophical Subjects, I have not done it altogether without example. For not only *Pliny* , a Person of a great Dignity as well as Parts, and Friend to one of the greatest *Roman* Emperors, hath left us in a Book, where he handles many Philosophical Matters, store of particular Receipts ; but our great Chancellour, The Lord *Verulam*, hath not disdain'd to Record some. And as for that Industrious Benefactor to Experimental Knowledge, the Learned and pious *Mersennus*, his Charity made him much more fearful to neglect the doing what good he could to others, than to venture to lessen his Reputation by an *Indecorum*, that in a Mathematical Book, and in a Chapter of Arithmetical Combinations, he brings in not only a Remedy against the *Erysipelas* , but even in a Medicine for Corns, where he tels us, That they may be taken away, by applying and dayly renewing for ten days, or a fortnight, the middle Stalk that grows between the Blade and the Root (for that I suppose he means by the unusual Word *Thallum*) of Garlick, bruisd. Nor is

it

performance of what his Conscience, his Country, his Family, his Necessities, and perhaps his allowable Curiosity challenge from him, that I wonder not so much at those Antient Heathens, that being Polytheists and Idolaters, thought themselves oblig'd, either to referre so useful an Art as that of Physick, to the Gods or God-like Persons; or to adde those, that excell'd in so noble a Faculty, to the number of those they worship'd. For my part, *Pyrophilus*, a very tender and sickly Constitution of my own, (much impair'd by such unhappy Accidents as Falls, Bruises, &c.) hath, besides (as I hope) better motives of Compassion, given me so great a sense of the uneasinesses that are wont to attend Sickness, that I confess, if I study Chimistry, 'tis very much out of hope, that it may be usefully employ'd against stubborn Diseases, and relieve some languishing Patients with less pain & trouble, then otherwise they are like to undergoe for Recovery. And really, *Pyrophilus*, unless we will too grossly flatter our selves, we can scarce avoid both discerning and deploring the ineffectualness of our vulgar Medicines, not onely *Galenical*, but Chymical; (for an active Body may yet be but a languid Remedy.) For besides that many that recover upon the use of them, endure more for Health, then many that are justly reckon'd among Martyrs, did for Religion; Besides this, I say, we daily meet with but too many in the case of that bleeding Woman, mentioned in the Gospel, of whom 'tis said, That she had suffer'd many things of many Physicians, and had spent all that she had, and was nothing better'd, but rather grew worse. And therefore I reckon the investigation and divulging of useful Truths in Physick, and the discovering and recommending of good Remedies among the greatest and most extensive Acts of Charity, and such, as by which a Man may really more oblige Man-kind, and relieve more distressed Persons, then if he built an Hospital. Which perhaps you will not think rashly said, if you please but to consider

sider, how many the knowledge of the Salivating, and other active Properties of *Mercury*, and of its enmity to putrefaction and Distempers springing thence, have cur'd of several Diseases, and consequently how many more Patients, then have recover'd in the greatest Hospital in the world, are oblig'd to *Carpus* and those others, who ever they were, that were the first discoverers of the medical efficacy of *Quick-silver*. And for my own particular, *Pyrophilus*, though my Youth and Condition forbid me the practice of Physick, and though my unhappy Constitution of Body, kept divers Remedies from doing me the same good they are wont to do others; yet having more then once, prepar'd, and sometimes occasionally had opportunity to administer Medicines, which God hath been so far pleas'd to bless on others, as to make them Relieve several Patients, and seem (at least) to have snatch'd some of them almost out of the jaws of death; I esteem my self by those successes alone sufficiently recompenc'd for any toil and charge my Enquiries into Nature may have cost me. And though I ignore not, that 'tis a much more fashionable and celebrated Practice in young Gentlemen, to kill men, then to cure them; And that, mistaken Mortals think it the noblest Exercise of vertue to distroy the noblest Workmanship of Nature; (and indeed in some few cases the requisite-ness and danger of *destructive valour* may make its Actions become a vertuous Patriot) yet when I consider the Character, given of our great Master and Exemplar, in that Scripture, which says, *That He went about doing good, and Healing all manner of Sicknes, and all manner of Disease among the people*, I cannot but think such an Employment, worthy of the very noblest of his Disciples. And I confess, that, if it were allow'd me to envy creatures so much above us, as are the Celestial Spirits, I should much more envy that welcome Angels Gharitable employment, who at set times diffus'd a healing vertue through the troubled waters of *Bethesda*, then that

That this Employment is better then the more fashionable of destroying Valour.

*Mat. 10. 38.
Mat. 4. 24.*

*John. 9. 14.
2 Kings 19. 35*

that dreadful Angel's fatal employment, who in one night de-
 stroy'd above a hundred and fourscore thousand fighting
 men. But, of the Desirableness of the skill and willingness *The Angels*
 to cure the sick, and relieve not only those that languish *Charitable*
 in Hospitals, but those that are rich enough to build them, *employment at*
 having elsewhere purposely discourf'd, I must now trouble *Bethesda*
 you no longer on this Theme, but Implore Your much need- *more desirab*
 ed pardon for my having been (beyond my first intentions) *then he who*
 so troublesome to You already. *destroy'd in one*
night 180000
fighting Men.

AN
APPENDIX
TO THE
FIRST SECTION
OF THE
SECOND PART.

Advertisements touching the following
 A P P E N D I X.

I Scarce doubt, but it will be expected that I should annex to the foregoing Treatise, those Receipts and Processes, which seem to be here and there promis'd in it ; But I desire it may be considered, that some passages, which an unattentive Reader may have mistaken, for absolute Promises, are indeed but Profers conditionally made to a particular Person; and so not engaging me, till the condition (which was his desiring the things mention'd to him) be on his part perform'd. And as for the other things, which every Reader may suppose to be promis'd Him, I have at hand this general excuse ; that at least I promis'd nothing to the Publick, whatever promises I may have made in the foregoing ESSAYES, having together with them been address'd to a private Friend. And I have two or three special Reasons to insist on this excuse ; for divers of my choicer Books and papers having not long since unhappily miscarried through the negligence of some Men, or the Fraud of others, it is not now possible for me to retrieve some of the things I was Master of, when I promised them. And then to revise carefully all the papers that remain in my hands of Affinity with the past Treatises, would take up more time then is allow'd me by other Studies and Employments, which I think of greater moment, or at least wherein I am much more concern'd, then to give this Book at present a full or accurate APPENDIX.

But though I might upon these and other Reasons Wholly excuse my self from the trouble of adding any Appendix; yet
 because

that (I say not the great Physitians or Chymists, who may, if they please, leave them unperus'd; but) those for whom I principally intend my Directions will think my having made them so particular a very excusable fault. And I make the lesse difficulty to suffer such things, as perhaps, I judge to be, in comparison of others, but trifles, to pass abroad, because finding of late years, that many persons of quality of either Sex, who scarce read any other then English Books, have (as I hope) out of Charity, or Curiosity, or both, begun to addit themselves to Chymistry, and venture to be tampering with Spagirical Remedies, it may not be unseasonable to supply them with some Preparations that may both save them time and Charges, and put them upon the use of Remedies, which, without being languid, are, if any thing discreetly given, safe and innocent, and wherein a little Error either in the making or the administering will be far lesse prejudicial to the sick, then if it were committed in the more vulgar (oftentimes, either falsely or obscurely prescrib'd) preparations they are wont to make of Acid Salts, Mercury, Antimony, and other Minerals, whose Activity for the most part make them need to be skilfully prepar'd, and judiciously given.

P p . .

To

The Irish Lithotomists Receipt, for the Stone in the Bladder.

Rec. *Aquar. Melon. Citrullor, Filipendulæ, Petroselin, syr. è 5 radicibus, syr. de B santiis, ana, unc. ij Oxymelit comp. unc. j. misce, quartam mixti partem sumas manè jejunus, & postea per octo horas à cibo & potu abstineas, aliam sumas partem eodem die post cœnam cum lectum intrare volueris; deniq; sequenti die reliquæ sumantur partes ut primæ; tertio verò die.*

Rec. Eleæ. lenit. dragm. iij. syr. Rosat. solut. dragm. ij. pulp. Tamarind. dragm. j. misceantur ac in scri laetis unc. iij. dissolvantur: totum bibas mane quatuor horis ante jus, quarto die sumas mane sequentis pulv. dragm. j. mixti insequentis Apozematis unc. iij. & olei Amygd. dulc. unc. sem.

Rec. Cinerum vitri, & Scorpionum pulveris, Lapid. Spongiæ, & lap. Judaici, Acori, sem. Altheæ, Millii solis, Saxifragii ana dragm. j. sem. laTuce, 4 sem. frigid. majorum ana dragm. sem. Trokiscor. Alkekengi, rad. pimpinellæ ana dragm. ij, fiat pulvis subtilis.*

Apozema.

Rec. Parietariæ, rad. Alth. ana Atj. sem. petroselini, Glychyrhiza ana unc. sem. balicacabi, unc. j. Cocu in aq. pluvie, sext. 2. & vini albissimi sext. j. ad medietatis consumptionem, & colatura melle hybernico dulcoretur.

Tum quarto illo die passerculum Trogloditem sale antea conditum edas una cum cœna, Et post cœnam lumbi, pubes, & tota renum regio oleis è granis Citri & scorpion. liniantur, etsi possibile esset prædicta olea per meatum urinar. in vescicam injiciantur, sitq; deinde pulvere, Apozemate, Troglodite & Oleis omni die utere, donec arenulæ aut lap. fragmenta una cum expulsis apparuerint.

Loco cinerum vitri sumi possunt cineres Camini & vires cinerum scorpionum supplere potest pulvis lumbricor. terrestr. probe in vino lotorum & postea exsiccatorum.

NE.

NB. [As far as I could conjecture by the Discourse I had with the owner of the Receipt , by Ashes of Glass he meanes the superfluous Saline substance , which the Glassemen are wont to call *Sandiver* ; but because he did not explain himself so clearly, and we know not yet a way of Burning Glass to Ashes, I think it will be most adviseable to substitute the Wood Ashes, which in the Receipt it selfe towards the close of it are appointed for a *Succedaneum*.]

To the One Hundred and Tenth Page;

[*Where the Vertues of the Pilulæ Lunares are toucht at.*]

THE great benefit that has redounded to many patients, from the use of the *Silver Pills*, here briefly mention'd, and commended, invites me to communicate as a considerable thing, the preparation of them, of which I do not pretend to be the Inventer ; having divers years since, learn'd it by discoursing with a very Ancient and experienc'd Chymist, whose name that I do not mention, will perhaps seem somewhat strange to those Readers that have observ'd me not to be backward in acknowledging my Benefactors in point of Experiments, and therefore I hold it not amiss to take this opportunity of declaring once for all, that 'twere oftentimes more prejudicial than grateful to one that makes an advantage by the Practise or Physick, to annex in his lifetime his name to some of his Receipts or Processes; because that when a Man has once got a repute, for having a Specifick in any particular Disease or Case ; his Patients, and their Friends will hardly forbear to apply themselves to him for that Medicine, though the same Medicine, but not known to be the same, should be made use of by a stranger, or divulged in a Printed Book. Most Patients being not apt to rely upon Medicines, that come only that way recommen-

ded; whereas if it were known that the Printed Receipt is the self same, which the Physitian employs, not only other Physitians would quickly make as much advantage of it as he, but many Patients would think themselves by that discovery dispens'd with, in point of good husbandry, from going to any Physitian at all, as knowing before hand the best prescription they are like to receive from him. The *Process* of the *Pilula Lunares* is this;

The Preparation
of the *Pil.
Lunares.*

Take of the best refined Silver as much as You please, dissolve it in a sufficient quantity of clens'd spirit of Nitre, or *Aqua fortis*; then evaporating away the superfluous moisture, let the rest shoot into thin Chrystals; these you may in some open mouth'd Glass place in sand, and keep in such a degree of Heat, that by the help of very frequently stirring them, the greatest part of the more loose and stinking Spirits of the *Menstruum* may be driven away, and yet the remaining Chrystals not be brought to Flow: These Chrystals of Silver you must counterpoise with an equal weight of Chrystals of Nitre; & first dissolving each of them apart in distill'd Rain-water, You must afterwards mingle the Solutions, and abstract or steam away the superfluous moisture, till the remaining Mass be dry, which you must keep in an open Glass, exposed to such a temperate heat of Sand, that the Matter may not melt (which you must be very carefull of) and that yet the adhering corrosive Spirits of the *Menstruum* might be driven away. And to both these ends You must from time to time stir the Mass, that new parts of it may be exposed to the Heat, and new ones to the Air, till you cannot descry in the remaining white Powder any offensive sent of the Spirit of Nitre, or of the *Aqua fortis*. And lastly You must take the Crum of good white-bread, made with a little moisture into a stiff Past, and exactly mingle with the newly mention'd Magistery or Powder as much of this Past, as is necessary to give it the consistence of a Mass
of

of Pills, which you may thence form at pleasure, and preserve in a well stopp'd Glass for use.

NB. First the Silver employ'd in this Operation, ought to be very pure and more exquisitely refin'd, then much of that is wont to be, which here in *England* is bought for fine Silver; for if the Copper wherewith Silver-Coyns are wont to be alloy'd, be not carefully seperated upon the Cupel, it may, being turn'd by the Acid *Menstruum* into a kind of Vitriol, when it is taken into the Body, either provoke Vomits, or otherwise discompose it.

2ly, The Spirit of Nitre, or (which in our case comes almost to one) the *Aqua-fortis* that is us'd about this Medicine, ought to be clear'd, as our Refiners phrase it, before the Silver be put in, for (as I elsewhere Note) in Salt Peter, there is oftentimes an undiscerned Mixture of Sea-salt, whose Spirit coming over in Distillation with that of Nitre; is apt to precipitate the Silver, which the Spirit of Nitre has dissolv'd. This I take to be the Reason of that practise of the best Refiners to purifie their *Aqua fortis*, by casting in some small peice of Silver, that they may afterwards securely put into it greater Quantities of the same Mettal to be dissolv'd. For the Saline Spirits fall to the bottome, together with the corroded Silver, which they precipitate as long as there is any of these Saline spirits left in the *Menstruum*, which after this may be decanted clear; and though you had put a little more silver then needed to it, it neither does harm nor is lost, the *Aqua-fortis* preserving none unprecipitated, but what there were no more Saline Spirits to work upon, so that the superfluous silver put in is already dissolv'd to Your hand.

3dly, The dry Mixture obtain'd from the Solutions of Chrystals of Nitre, & Chrystals of Silver, must be often stirr'd and kept longer in the Sand, before all the offensive Spirits will be driven away, then till Experience had inform'd me, I did imagine.

Fourthly,

Fourthly , if the Chrystals of Silver be considerably Blew or Green , 'tis a sign the Silver was not sufficiently purg'd from Copper, else the Mixture we have been speaking of, will look of a White , good enough. And possibly 'twas by reason of the not being careful to take sufficiently Refin'd Silver , and of the not knowing how to improve the Chrystals of Silver , by the addition of those of *Nitre* , and especially how to free them from the stinking and Corrosive Spirits of *Aqua-fortis*, that it is come to pass, that though there being some Chymical Writers, Processes not very unlike this , yet the Chrystals of Silver have been censur'd and laid aside as not always safe even by those , who otherwise much magnifie the Efficacy of those they us'd .

Fifthly ; When you are about to make up this Mixture with the Crum of Bread into a Mass , and so into Pills , 'twill not be amiss to dispatch that work at once , for usually it leaves an ugly Blackness on the Fingers , that cannot under divers days be gotten off.

*The Dose and
Use of these
Pills.*

Sixthly, In taking of the Pills care must be had , that they be sufficiently lapp'd up either in a Wafer wetted with milk, or the Pulp of a Roasted Apple , or some such thing , that they may not touch the palat , or the Throat, because of the extream and disgusting bitterness , which is to be met with in the Chrystals of Silver , and which is not the least thing , that with nicer Persons does Blemish these pills.

Seventhly , The Dose is somewhat uncertaine; because they work much according to the Constitution of the Body, and especially according as it abounds with Serous humours; Wherefore 'tis adviseable to make the pills of the size of very small pease , of which one given at Bedtime , is a sufficient dose for some Bodies , others will require two; and in some we must ascend to three , and if the Patient be Hydropical, or be otherwise much molested with serous Humours, it is observable that sometimes one dose will work two days ,

or

or four days, (may be five or six) successively, but yet moderately and usually, without weakening the patient, in proportion to such copious Evacuations.

Eighthly, Besides the Dropsie, wherein we have mention'd this Remedy as a Specifick, it often proves very available in other Cases, wherein Men are troubled with serous Humours. But the first distempers, which I heard it Magnified for, were those of the Head, and *Genus Nervosum*; and a great *Virtuoso* of my acquaintance that inherits a disposition to the palse, has several times told me, that if when he begins to find himself disordered, he take a dose of these pills, he is thereby constantly reliev'd. But of the particular Cases wherein we have had opportunity to take notice of their Effects, we have not now, but may perchance another time have leisure to entertain You.

Lastly, That skilful and succesful Chymist Dr N. N. who doth much both use and esteem this Remedy, being desir'd by me to let me know, if he had any objections against it, informs me, that when he hath given these Pills oftentimes, and without intervalls, though they did not either Salivate or Vomit, or much weaken the Patient, yet they would at last be attended with a kind of Incipient *Leucoplegmatia*, which he easily prevents by intermitting for a while the use of the pills, after every second or third time that he administers them, & giving when he expects it to be requisite, some *Crocus Martis*, Extract of *Juniper*, or other astringent or Hepatick medicines to corroborate the *Viscera* and preserve their Tone.

To the One Hundred thirteenth Page.

(Where mention is made of the Cure of one, concluded to have a Gangrene, by an inward Medicine.

THe Cure mention'd in this place, having been perform'd by that Medicine, which from the Name of that Great Commander as well as *Virtuoso*, who was the Author of it, passes

passes under the Name of *Sr. Walter Rawleighs Cordial* , and this being but one of many remarkable (and some of them stupendious) Cures which have been wrought by it from time to time, especially of late that it hath been more us'd, I am induc'd to annex here the yet unpublish'd Receipt, partly, because there are divers Receipts that are each pretended to be the true , magnify'd by their severall Possessors ; And I had the liberty of looking it out in a Receipt-Book, preserv'd by the Authors Son ; and partly because, though I will not affirm, that a skilfuller or more promising Composition of the same Ingredients could not have been devised ; Yet the following Receipt has been abundantly recommended by Experience. And I remember that but a while since , a Person of Note having sent to me, to desire a taking of this Cordial for a certain Knight , who after all that Skilfull Physitians could do, had long lain a dying ; I the other day chanc'd to meet this Knight at *White-Hall*, well , lively , and with a Face whose Ruddiness argued a perfect Recovery , & yet he is not very farre from seventy Years of Age , and had before he grew so ill, long conflict'd with a tedious Ague, and feaver, which had reduc'd him to that Extremity, when the Cordial was brought, that, as himself told me, he neither was sensible when they gave it him, nor had known what he did, or what was done unto him, during the space of several dayes before.

*Sr Walter Rawleighs Cordial, after Sr R.K. his way
(set down verbatim as I the Authour received it.)*

TAKE Burrage-Flowers, Rosemary-Flowers, Marigold-Flowers, Red July-Flowers, *Rosa-folis*, Elder-Flowers, of each one Pottle, after they are dryed in the Shade.

Take also of Scordium, Carduus, Angelica, Baulm, Mint, Marjoram, Setwall, Betony *ana* four handfulls, after they are dry'd in the Shade.

Take

Take also of the Rinds of Sassafras of Virginia, *Lignū Aloës*,
ana, four ounces beaten to powder; of Kermes, Cubebs, Car-
 damoms, Zedoary, *ana*, one ounce; of Saffron halfe an ounce;
 Juniper Berries, Tormentil Roots, Round Birthwort Roots,
 of each one ounce, of Gentian Roots halfe an ounce.

Draw the Tincture or Extract of these with Spirit of Wine
in Balneo, & save all the Ingredients after you have taken out
 the tinctures, & burn them, & put their salt into their tinctures.

Take six ounces of the Extracts of all these with their Salt,
 and put thereto of the Tincture of Coral three ounces; *Terra*
Sigillata four ounces; Pearl prepar'd two ounces; Bezar-stone
 three dragmes; hartl-horn calcin'd four ounces; amber-greese
 four dragmes; Musk. gr. xxx; Sugarcandy one pound and an
 half, ground very fine, and searfed through a fine Searse.

Then the musk & amber must be ground, & by little & lit-
 tle mingl'd with it, the more you grind the amber, the better.

Then put to the Sugarcandy all the dry Materials before
 directed, and make all as small as possibly You can.

Then upon a great hollow grinding Stone mingle the Tin-
 ctures, and dry things together: (which must be done by a
 strong man used to that work:) & whil't 'tis in grinding, put
 of syrrup of Limmons, & syrrup of Red-Roses equal parts in-
 to it, else it will be so dry, that twill neither grind nor mingle.

*How to make the Tincture of Coral
 for this Cordial.*

Take eight ounces of Coral, and put it unbeat-
 en into a calcining Pot Unluted, & let it stand
 twenty four Hours in a calcining or Glasse fur-
 nace, till the Coral be as White as Snow; then
 put it in three quarts of distill'd Vineger in a
 long Glasse with a narrow mouth, and with ano-
 ther small Glasse or Vial put into the Mouth of
 it, the Belly upwards, to save the Vineger from
 wasting, *Thus*; And set it in a sand furnace,
 so as the sand may be as high as the Vineger.

Q. q

Let



Let it boyl without intermission twenty four Houres, by which time Vineger will become red; so, when 'tis cold, pour off the Vineger into a Glas-Bason, or a Bell-Glass, and vapor away all the Vineger *in Balneo*, and gather the Coral, being perfectly dry, for your Use. You may strike down Your Pearl with Oyl of Vitriol, and Oyl of Sulphur requal parts, which is accounted the best way to prepare the Pearl: but Sr R. K. did use to prepare his Pearl by juyce of Limmons.

[The Dosis for a Man is about the bigness of a small Hasil-nut, but where prevention only is aim'd at, or some such use as the dissipating the Fumes of the Spleen, as they call it, the bigness of an ordinary Pease, may suffice; so in urgent Cases the Dose may be increas'd to the quantity of a Nutmeg. It is usually given by it self upon an empty Stomack (the Patient being kept Warm after it to promote Sweat) in Feavers, Want of Spirits, violent Fluxes, and several other distempers, where Diaphoreticks and Antidotes are proper, and (especially) potent Cordials are requir'd.]

[To the One Hundred thirteenth Page;
Where a Reccipt that cur'd Fistula's is mention'd.]

A Water for a Fistula, and all manner of Wounds and swellings, or old Ulcers, Cankers, Tetters, Boiles, or Scabbs in any place, or Green Wounds.

TAKE of Bole-Armoniack four ounces, of Camphire one ounce, of White Vitriol four ounces; Boyle the Camphire and the Vitriol together in a little Black Earthen Pot till they become thin, stirring them together till they become hard in setting; than Bruise them in a Mortar to powder, and Beat the Bole-Armoniack it selfe to powder, and then mingle them together, and keep the powder in a Bladder

Bladder, till such time You use it; then take a pottle of Running Water, and set it on the Fire till it begin to seeth, then take it from the Fire, and put in three good spoonfuls of the powder into the Water whilst it is hot, & after put the Water and powder into a Glasse, & shake it twice a day to make the Water strong: But before You use it, let it be well settled and very Clear, & apply it as hot as the Patient can well suffer it; & lay a clean Linnen Cloath, four double, to the Sore, it being wet in that Water, and bind it fast with a Rowler to keep it warm; do it Morning and Evening till it be whole. This Water must be put into an Oyster-shell, not in a Sawcer when you dress the Sore, for the pewter will suck it up. Remember You put three as good Spoon-fuls of powder as you can press into the Spoon. Take heed no one Drink of this water, for it is Poyson. To make it stronger, beat an ounce of Alom to powder, and mingle it with the other powders.

Take of Bole-armoniack halfe an ounce, white Vitriol one ounce, of Gamphir two ounces, make them all into powder; then take a Pottle of Smiths-water, and as much Spring-water, and mingling them, set them upon the Fire; as soon as it begins to Seeth, put in the powder very softly, stirring it all the while; as soon as the powder is in, take it off the Fire, and dresse the wound with it twice a day, laying a Cloath folded four times and wetted in the water, it being very hot, and so applied to the wound.

NB. [This is the Receipt *Verbatim* as I find it among my old Papers, but I am not sure that among those I cannot now come by, there may not be something concerning a way of making a small pliable Tent that may accommodate it self to the crooked Figure of the Cavity of many Fistula's. For methinks I remember, that the Chirurgion prescrib'd the conveying the Medicine by the means of such a flexible tent a great way into the cavity, if not to the Bottom of the Fistula, which was thereby to be cleansed.]

Soot, *Pyrophylus*, is a Production of Fire, whose Nature is almost as singular, as in the manner of its being produc'd, for it is (if I may so call it) a kind of volatile Extract of the Wood it proceeds from, made instead of a *Menthrum* by the Fire, which hastily dissipating the parts of the Body it acts on, hath time enough to sever it into smaller Particles, but not leisure and aptitude to reduce it into such differing substances as pass for Chymical, or Peripatetick Elements, but hastily carries up the more volatile parts, which being not yet sufficiently free'd from the more fixt ones, take them up a long with them in their sudden flight, and so the Aqueous, spirituous, saline, Oleaginous and Terrestrial parts ascending confusedly together, to fasten themselves to the sides of the Chimney in that loose and irregular Form of Concretion, which we call soot: An enquiry into whose Nature, as it may be consider'd in the survey of the distinction of salts, must be elsewhere look'd for; Our mentioning it at present, being only to take occasion to tell You, that as ill sented and despis'd a Body as it is, *Hartman*, (one of the most experienc'd and happy of Chymical Writers) scruples not to reckon the spirit and oyl of it among the Noblest *Confortantia*, such as prepar'd Pearle, Coral, Amber-greece, and other eminent Cherishers of Nature, His preparation is for substance this; Take of the best soot (such as adheres to the lower part of the Chimney, and shines almost like Jet) what quantity you please, and with it fill up to the Neck a very well coated Glass Retort, or an Earthen one, and luting on a capacious Receiver, distil the matter in an open fire intended by degrees, whereby you will drive over the Phlegm, the whitish spirits, and the Oyl first of a yellow Colour, and then of a Red, separate the Phlegm,

*Hartmans
preparation of
Spirit and Oyl
of Soot.*

Phlegm; and for a while digest the spirit and the Oyl together, on which afterwards put half the quantity of spirit of Wine and Distil them several times, whereby you will obtain together with the spirit of wine, the spirit of foot; and also a very depurated Oyl, smelling like Camphire. Out of the Calcin'd *Caput mortuum* after the common way extract a salt, which *Hartman* commends as a most excellent curer of exulcerated Cancers; This salt, saith He, is drawn with Vineger, in which Liquor is a Cold moist place, it is again Dissolv'd, and therewith the Cancerous Ulcers being once or twice annointed, the venenosity will be visibly drawn out like a Vapour, and then the forementioned Oyl being lightly sprinkled upon the place will breed on it a kind of Crust like a skin, which Spontaneously coming off in five or six Days, will by its falling off, argue the Consolidation of the Ulcer. What this so extoll'd Remedy will perform I know not, having never made trial of it, nor thinking it very likely, that a bare Alcalizate salt should have such *Specific Vertues*, nor is it requisite I should insist on it, being here to discourse to you of the distill'd Liquors of foot; in prosecution of which design, let me tell You, that *Hartman* prescribes the administ'ring of the spirit from six to ten Grains, of the Oyl from two or three drops in wine, or any other convenient Vehicle, & concerning the Oyl he adds, That if three Drops of it be given in Vineger to an almost gasping Man, he will be thereby wonderfully refresh'd, and as it were reviv'd, to which he annexeth this Prognostick, that if the Remedy produceth Copious sweats, it will recover the Taker; but if not, he will Die.

That this spirit of foot describ'd by *Hartman* may be a very good Medicine I am very apt to think; but because 'tis not a meer spirit of foot, but a mixt one of spirit of wine, and spirit of foot, we have rather chosen to proceed with the foot (of wood) without addition, both as to the distillation

Hartm. Prax. Chim. p. 12.

The Authors directions concerning preparations from Soot.

lation of it, and the ordering of the distill'd liquors, after the manners to be mention'd ere long, when we shall acquaint You with our preparations of Blood and Harts horn, which if You please to apply to Soot, You may save Your self, and me, the labour of Repetitions. Yet it may be not amiss to advertise You here of two things: the one, that if You employ very good and fat Soot, and fill up the Retort with it to the Neck; You must be very careful to encrease the Fire orderly, and but by moderate Degrees; or else you may chance to make the matter boil over out of the Retort into the Receiver; as it lately happen'd to us, when having warily order'd the Fire for several houres we thought our selves past any such danger: And the other, that as to the Medicinal Vertues of the spirit, and salt of Soot, I shall not now particularize them, partly that I may save time, and partly because they may be well enough gather'd from their affinity to the Volatile salts and spirits of animal substances hereafter to be treated of, and from what I shall have occasion to say, of the perfuming of the salt Soot towards the close of this APPENDIX.

To the one Hundred Fourty third Page.

URine is a Body, which, as homely and despis'd as 'tis wont to be, may, by skilful ways of ordering it, be made either alone, or in conjunction with other Ingredients, to afford such a variety of useful Substances, that I find *Reusnerus* publish'd an Entire Treatise, which yet I never could get sight of, under the Title of *Synopsis Remediorum ex Urina preparatorum*, besides what other Chymists have since divulg'd on the same subject, which I forbear to mention; because several of them I have not try'd, and many others I think scarce worth trying. But because even all our own Observations concerning the Preparations and uses of things afforded

*Of the use of
the preparati-
ons of Urine.*

afforded by Urine, would take up more time and Room, then I can now allow them, I shall here only take this occasion to intimate thus much in general, that the Spirit and Salt of Urine may be made far greater use of, than Men yet are prone to think; not only in Physick, but in Chymistry, and perhaps I durst add in Natural Philosophy too. And though *Helmont* be not wont to lavish his praises upon worthless Remedies, yet he calls it *Nobile ad Icterus, aliosq; morbos, Remedium*. And in another place, speaking of the Saline Christsals of Urine, he hath this expression: *Que quanquam ad Veteres Excrementorum Oppilationes conferunt, nihil tamen adversus Lithiasin*; which seems, by denying to the Salt of Urine some Vertues ascrib'd to it by many other Chymists, to bring some credit to his praises of it. (And indeed a friend of mine, that has try'd it in the Jaundise, affirms it to deserve the Commendation he gives it in that Disease.) And though I fear our Author Hyperbolizeth, where he (elsewhere) thus writes: *Spernit eos sapientia (he means sure, that which is proper to the Spagyrist) qui Materiam ex qua dispositiones, Contenta, Proprietates, Progressum & significationes Lotii addiscere recusarent per ignem*; Yet perhaps the Hyperbole is not altogether so extravagant as most Readers will think it. And I remember, that a while ago, conferring with the Publick Minister of a Foreign Prince, who is a very inquisitive and experienc'd Person, He freely told me, that though he had Travelled very much, and divers times not in a Capacity, yet the greatest Chymist that ever he could make acquaintance with, us'd to tell him, that Salt of Urine was so precious a thing, that 'twas a pitty it should be us'd in ordinary Diseases; But what his Reasons were for valuing it so much, he would not declare, and therefore I shall lay no great weight upon his Testimony. And yet I must not at this time particularly declare, upon what account it is that I doe so value the volatile Salt of Urine, of whose

De Lithiass.
c. 3. n. 3.

whose Vertues (whilst 'tis single) I shall only in a word observe to you now (what is pertinent to the occasion of my mentioning it at present,) namely, that when 'tis well prepar'd [according to the way plainly enough, though but very briefly couch'd already] it differs so little in smel, tast, volatility, penetrancy and some other manifest Qualities, from the Salt of Harts-horn, and that of Mans Blood; that such effects, though perhaps somewhat less powerful, may be not improbably expected from it, as are produc'd by the other.

To the One Hundred Fourty fourth Page.

*Of the preparations of
Arians blood.*

Though I have not in this place made any absolute Promise, of annexing any thing, more particular touching the Spirit of Blood; and though I cannot now find, and I fear may have lost those of my Papers concerning that subject, which were the least inaccurate; Yet, setting aside former tryals, a recent Account brought me by a Physician, whom I had entrusted with some of it, represents it as so very good a Medicine, that I am content to subjoyn, what particulars I have lately found among my loose Papers concerning it, as I many years agoe sent them to a friend; and this I rather do, because there being annexed to the Proceſs divers Observations of general Import to such kind of Preparations, they will be the better understood with it, then without it, and I have not now the leisure to new-mould them.

Thus then;

TAKE of the Blood of an healthy Young man as much as you please, and whilst it is yet warm, adde to it twice its weight of good Spirit of Wine, and incorporating them well together, shut them carefully up in a convenient Glas Vessel, wherein the matter must be set to digest in

** This, if I
misremember
not, was the
Proportion I
employed in
the exaltell of*

my Experiments of this kind, but it seems to be Essential to the goodness of the Remedy: the Spirit of Wine serving chiefly but to keep the Blood from corrupting.

Balneo

Balneo, or Horfe-dung, for six weeks, or more; then in a Glafs head and body, placed in Afhes or Sand, draw off with a gentle Heat as much Liquor as will come over without neceffitating you to impreff any *Empyreuma* upon it, the remaining matter muft be taken out and put into a ftrong and capacious Retort, which being placed in fand, and accommodated with a large Receiver carefully luted to it, the matter therein lodged muft be gradually preffed with a vehement Fire, which muft at length be encreafed till it be ftrong enough to give the bottom of the Retort a red heat. There will firft come over (after perhaps a little Phlegm) Spirit, either accompanied or clofely followed by a copious volatile Salt, faftning it felfe to the fides and top of the Receiver; and much about the fame time there will alfo come over an Oyl, or two, or more (for I have not obferved the oleaginous part to come constantly and regularly after the fame manner) the Receiver being taken off, all that it contains may be poured together into a convenient Vial, to be therein digefted for a Moneth, if you please: or otherwife without that previous digeftion, you may wash down the volatile Salt, adhering to the fides of the Receiver, with the Spirit and Oyl well shaken about it, and pour altogether into a large Glafs Funnel well lined with Cap-paper, firft moiſtned with the Spirit of fair Water, through which the Spirit and as much of the Volatile Salt, as it and the Phlegm can difſolve, will paſs firſt, leaving the Oyl behind them in the Paper, which muſt be reaſonably ſet aſide, or elſe the Oyl alſo, though more ſlowly, will paſs through the Filtre: The phlegm, Salt and Spirit, muſt be rectified with a very gentle heat, ſo often, till the Phlegm be perfectly ſeparated, and they leave no ſaces: The oyl alſo may be rectified two or three times from it's own *Caput Mortuum* calcin'd, or elſe from Salt of *Tartar* to deprive it of it's muddineſs. The diſtempers wherein this *Arcanum* or Spirit of Man's Blood is

R r

proper,

proper are, divers, but chiefly Astmah's, Epilepsies, acute Feavers, Plurisies and Consumptions. But to comply with my present hast, I shall advertise You in the general, as to the use of this and the other Remedies to be subsequently mention'd, that for them I must refer you to the particular Narratives, which I shall scarce if You seasonably desire them refuse You: And in the meane time, because the volatile Remedies are near enough of kin to each other, I shall add to this first Process (which is at the least one of the noblest of them) some Observations of a more general nature, we may both of us avoid the trouble of needless Repetitions.

Observations.

Observations
touching the
manner of
drawing the
Volatile salts
and Spirits of
Salt & Blood
and other sub-
stances belong-
ing to the Ani-
mal Kingdom.

1. I ignore not that there are extant in *Burgravius*, *Beguinus*, and divers other Chymical Authors, very pompous and promising Processes of the Essence of Mans Blood, to which they ascribe such stupendous faculties as I should not only wonder to find true, but admire that they can hope the Reader should believe them so. But of these Preparations, some being as that of *Burgravius* in his *Biolychnium*, very mystical and unlikely; and others, like *Beguinus* his *Q. E. Sanguinis humani*, exceedingly laborious and not so clear, I have never put my self to the trouble of making them, but I shall be very forward to acknowledge their excellency, if any Man shall vouchsafe me an Experimental Conviction of it. For though I think the preparation of Blood no bad one, yet I am far from daring to affirm there cannot be a better.

2. He that intends to have any considerable quantity of this spirit and salt, must provide himselfe of a large proportion of Blood, or else he is like to fall far short of his expectation; because as full of spirits as Blood is supposed to be, it yeilds commonly (at least the best I have hitherto met with) no less than two thirds, or more, of Phlegm, besides a not despicable

cable quantity of terrestrial and unserviceable Matter.

3. It is requisite, both that the Retort wherein the dried Blood is distilled be pretty large and strong, and that the Fire be very carefully and gradually administred, least either the copious Fumes break the too narrow Vessels, or the Matter too hastily urged boil over into the neck of the Retort or the Receiver, both which dangers this Advertisment may help you to avoid at a cheaper rate, than I, who have not been forwarn'd of them but by unwelcome Experience.

4. There is a Friend of mine, an excellent Chymist, whose rare Cures first gave me a value for Remedies made of Blood, who useth (as himself assureth me) to mingle with the spirit that other Liquor, drawn over at first in a Head and Body, and twice or thrice rectified by it self. But that Liquor consisting almost totally of the spirit of Wine, and the not over-grateful Phlegm of the Blood, though there may perhaps be passed into it some of the more fugitive Particles of the volatile Salt: Yet they being so few as scarce discernable, this Liquor seems fitter to be made a Vehicle, than an associate of our spirit, and perhaps too is not in all cases the most proper vehicle in which it may be administred: (though if it were not for the spirit of Wine, I should somewhat suspect that the Phlegm, though so destitute of the more active Ingredients, as to be fit to be kept separated from them, may not it self be quite devoid of specifick Vertues.) But my esteem of the Artist I have mentioned, doth make me think it fit to acquaint You with his Practise, notwithstanding that hitherto his authority be the chief thing that recommends it to me.

5. Divers ways may be propos'd of purifying this spirit and Salt we are discoursing of, but having try'd several, that which I now use is this that follows: I put the Salt Phlegm, and spirit together, in one of the highest and slenderest Bo-

dies I can get, that the Phlegm might not be able to ascend easily into the Head, and that the volatile Salt may be the better separated: Then in a very gentle heat (I most use that of a Lamp Furnace) there will ascend a pure white and volatile Salt, adhering to the cheeks and nose of the Glass-head, which if I desire by it self, I sweep it away before the Spirit begins to rise; but most commonly I suffer the Distillation to proceed, and the ascending Spirit to carry down part of the volatile salt into the Receiver, and so I continue the same degree of heat, till there arise so weak a spirit that it plainly begins to dissolve the volatile salt: Then shifting the Receiver, I reserve the strong spirit and volatile salt by themselves, & take the succeeding weaker spirit by it self also; to which, if I please to fortifie it, I add as much of the volatile salt, formerly reserved, as it is able to dissolve. In the bottom of the Cucurbit or Vial, there will remain a phlegmatick kinde of Liquor, which usually contains some of the salt or spirit, and sometimes too (which is somewhat odde) some of the oleaginous part of the Blood, which did not before appear to have been associated with the spirit, and to have passed through the Filtre with it. This nauseous Liquor may be kept by it self till you have a sufficient quantity of it, to be worth the trouble of severing from it the nobler parts: The spirit and salt above mentioned may be again rectified, *per se*, with the like gentle heat as before, so often, till they leave behind them no *faces* nor Phlegm at all. But this is requisite to be done only when to master some stubborn Disease, the Medicine is to be exalted either to its supreme, or at least to some approaching degree of Purity and Efficacy, for otherwise so exquisite a Depuration is not always necessary.

6. As for the Oleaginous part which the Fire forceth out of Blood, my observations of it hitherto have so little agreed, that, I dare as yet speak but hesitantly concerning it. For some times but one Oyl hath been drawn over, sometimes

two:

two: And I remember, last Year, a parcel of Blood, that was kept in a Dung-hill for many Months, yielded us a blackish and muddy Oyl, a purely red one, and another of pale Amber colour, which would not mingle with the darker; of each of which sorts I yet reserve some by me. This difference may possibly proceed partly from the previous preparation, or unpreparedness of the Blood, and partly from the various administration of the Fire employed to distil it. But for the most part we find these Animal substances (if the degrees of Fire be orderly administered, and the heat sufficiently intended towards the close of the Distillation (to yield a double Oyl: the one more light and pure; which swims upon the spirit; the other more muddy, adust and ponderous, which sinks to the bottom of it. The use of these Oyls hath, by reason of their Fetidness, been by most Authors absolutely rejected; and even those few that do not altogether reject them, forbid their inward use, and allow them to be but externally employed: But considering, *Pyrophylus*, how much of the efficacy both of Plants and Animals is observed to reside in their oleaginous part, it seem'd not improbable to me, that these Oyls might deserve a better usage, then either to be wholly thrown away, or confin'd to outward services; and therefore having not long since given a Friend of mine some pure yellow Oyl of Man's Blood, dissolved in spirit of Wine, to try upon a Patient of his, sick of a Hæctick Fever (in which Disease I had seen the spirit of Blood very succesful) within a few days he brought me word of the unexpected recovery of his Patient, to whom he administered our Medicine (that I may not conceal from you that circumstance) in *Balsamus Samech*, made with spirit of Vineger instead of spirit of Wine; the remaining part of this yellow mingled Oyl I keep yet by me, to make further tryals with it. And that such Oyls may not be lost, I have been attempting (for I am yet upon my tryals) several ways

to

to make them serviceable. Some of them that are of a more pure and defecated nature, I have (which is not unworthy your noting) found capable of readily uniting with spirit of Wine, with which they may be allayed at pleasure: In others I have separated the finer and more volatile part, by drawing them over with a very gentle heat in a Retort half full of Water, which will carry over the lighter part of the Oyl with it into the Receiver, wherein the Oyl will swim upon it, and may be afterwards sever'd from it by a separating Glass, or any other convenient way (but I fear that this method, though it finely clarifie Oyls, may rob them of the best part of the Efficacy they may perchance derive from the latent admixtion of somewhat of the volatile Salt :) at the bottom of the Retort there will remain a dark and thick substance, whose nature I have yet had opportunity to enquire into. Out of some Oyls (drawn from unprepared Materials) which would not dissolve in spirit of Wine, have, by digestion with spirit of Wine, drawn much of the sent and tast; the spirit probably imbibing some of the finer parts of the Oyl, or else associating to it self some volatile salt that yet lay lurking in it: For sometimes I have observed Oyls, after long keeping, to let fall a volatile salt undiscerned in them before. Having also sometimes mingled the heavier and lighter Oyls of the same Body with dephlegmated spirit of Wine, and in a low Retort drawn over what will rise in a very gentle heat (inferiour to that of a *Balneum*) I have found the spirit of Wine to carry over with it so many of the more subtile and active parts of the Oyl, that it was more richly impregnated therewith, then you will be apt to expect. But of what use this oleaginous Spirit may be in Physick, I have not yet had time to consult Experience, which I hope will, ere long, teach me better ways of improving the rejected Oyls we have been speaking of, than are those almost obvious ones hitherto mentioned, wherein I am

very

very far from aquiescing ; especially , since I cannot but suspect but such active parts of such Concretes , would be found very capable of a great Improvement , if we were as skilful to give it them.

7. The terrestrial Substance that remains after the Li-
quours are drawn off, if the Blood have been duly prepared,
affords but so inconsiderable a quantity of fix'd Salt , that
unless the *Caput mortuum* be exceeding copious, the *Alkali*
will hardly be worth extracting : Besides that, if it could be
obtain'd in a not despicable quantity , I should , what ever
is pretended, very much doubt whether it would be endow-
ed with very extraordinary Vertues, the violence of the Fire
usually depriving fix'd Salts of the Specifick Qualities of
their concretes: and even in the first Salt of Serpents them-
selves, I have not discerned other, Than the wonted Proper-
ties of *Alkhalizate* Salts.

8. Because you may sometimes not have the leisure to
wait six weeks for the Preparation of Blood ; and because
often times the occasion of using the Medicines we have been
describing , may be so hasty and urgent , that unless some
speedy course to relieve them be taken before the Physick
can be prepared, the Patients will be dead. I think it not
amiss *Pyrophylus* , to advertise You , That though without
any previous Preparation of Blood you should immediately
distil it , provided an orderly gradation of heat be carefully
observed , it will yield you a reddish Spirit, and (besides an
Oyl or two) a volatile Salt ; which being rectified , are so
little inferiour, in any Properties discernable by the smell or
tast , to the Salt and Spirit of predigested Blood , that 'tis
very probable their Efficacy will emulate, though not altoget-
her equal that of the more laboriously prepared.

9. And because it is difficult to get the Blood of healthy
Men, and perhaps not so safe to use that of unsound Per-
sons ; and because many have a strong Aversion , and some

an

an Insuperable, though groundless abhorrency, from Medicines made of Man's Blood, I have thought it not amiss to try whether that of some other Animals prepared the same way, might not afford us as hopeful Medicines: And because the Blood of Deer is chiefly (and perhaps not causelessly) commended by Authors, we have handled it according to the foregoing Process, and thereby obtained of it a Spirit, and Salt, and Oyl, whose penetrancy, and other resemblances, makes us hope that they may prove good *Succedanea*, in the defect of those Analogous Remedies (drawn from humane Materials) which we have been treating of.

And to this let me, *Pyrophylus*, on this occasion, annex this Advertisement, That though in these Papers, and what I have further written of Preparations of this nature; I name not any great number of Concretes, as having drawn their volatile Salts & Spirits, yet I have endeavoured in these Discourses to give You in the Instances I insist on, so much variety of Examples, that either by the Processes therein set down, or by the Analogy to them, You may, I suppose, be directed with the help of a few trials, to obtain the volatile Salts and Spirits of most Concretes that belong to the Animal Kingdom, and that are capable of affording any. For by the method we prescribe, a little vary according to the exigences of particular Bodies to be distill'd we have drawn the Spirits, Salts and Oyls of Sheeps-blood, Eeles, Vipers, &c. the latter of which yield a Salt and Liqueur, which in Italy, by divers Learned men, is superlatively extoll'd against obstructions, foulness of the Blood, and I know not how many Diseases proceeding from these two general Causes. And though I dare not deny that divers of those Praises may be well enough deserv'd, by the Remedies to which they are ascrib'd, yet I am not apt to think them much superior to the generality of volatile Salts: And even the spirit and salt of Sheeps-blood it self, did, by their penetrancy

trancy of taste and fugitiveness in gentle heats, promise little else Efficacy than those others so much celebrated Medicines.

10. Nor is it only by being administred it self, that one of this sulphureous and subtile kind of Spirits may become a good Remedy, but also by its being made a *Menstruum* to prepare other Bodies: For it will extract Tinctures out of

*How to draw
Tinctures of
Sulphur
&c. with the
Saline Spirits,*

several sulphureous and resinous Concrets, whose finer parts, by being associated with so piercing a *Vehicle*, may probably gain a more intimate admission into the Body, and have their

vertues conveyed further than otherwise they would reach. And a Learned Doctor, to whom I recommended such kind of Remedies, confessed to me, that by the bare extractions of appropriated Vegetables themselves, with Spirit of Urine, he perform'd no small matter. But one difficulty You may meet

with in drawing the Tincture of Minerals, and other very compact Bodies, even with good Spirit of Urine. (for that I account to be the cheapest of these volative *Menstruum*, and the most easie to be obtain'd in good quantities) For we have

found, but with a little heat, the more fugitive Particles to ascend to the upper parts of the Glass, and there fasten themselves in the form of a Salt; by whose recess, the debilitated

Liquor was disabled from drawing the Tincture so powerfully as was expected, wherefore we were reduc'd to make our Extractions in short neck'd Glass Eggs or Vials exquisitely stop'd (which may also be plac'd stooping in the

Sand) and when we perceiv'd much to be lodg'd in the necks of the Vessels, by barely inverting them, the hot Liquor soon reimbib'd the Salt, and was fit to be plac'd again in

Sand; to that notwithstanding this difficulty, we were able by this means, in no long time, to impregnate the Spirit of Urine, or of Harts horn (for I do not perfectly remember which it was) with the Tincture of Flowers of Sulphur, which may probably prove a noble Medicine in divers affections of the Lungs, since in them these volative Liquors alone have

S f

been

been found very effectual. And I remember, I have sometimes made a much shorter & more odde Preparation (which at any time You may command) of Crude *Sulphur*, whereby in not many hours I have, by the means of Salts, brought over such a sulphureous Liquour or Tincture, as even in the Receiver was of a red Colour, as well as of a strongly sulphureous Scent.

[To the Page 154, 155, &c. where *Ens Veneris* is treated of.

Now the Author first
happened upon
the preparation
of *Ens Veneris*.

BUT before I enter upon particulars, I think it will not be amiss to tell you how this preparation first occur'd to Us, because by that Information, Your happier *Genius* may peradventure hereafter be prompted to improve this Remedy, or to devise one more approaching to the Nature and Excellency of that which we endeavour'd, but with very imperfect success to light on, or equal, by our *Ens Veneris*. I must then tell you, that an Industrious Chymist (of our Acquaintance) and I, chancing to Read one day together that odde Treatise of *Helmont*, which he calls *Butler*, when we had attentively perus'd what he delivers of the Nature as well as scarce credible Vertues of the *Lapis Butleri* he there mentions, we fell into very serious Thoughts, what might be the matter of so admirable a Medicine, and the hopefullest manner of preparing that matter. And having freely propos'd to one another our Conjectures, and examin'd them by what is deliver'd by *Helmont*, concerning the Preparation of *Butlers Stone*, or some emulous Remedy we at length concur'd in concluding that either the *Lapis Butleri* (as our Author calls it) or at least some Medicine of an approaching Efficacy might, (if *Helmont* did not mis-inform us) be prepar'd by destroying (as far as we could by calcination) the body of Copper, and then subliming it with *Sal Armoniack*.

And because the Body of *Venus* seems lesse lock'd up in good

good Vitriol, then in its metalline form, we concluded that it was best to calcine rather the Vitriol, then the Copper it self, and, having freed the *Colcothar* from its separable Salts, so to force it up with *Sal Armoniack*. But the Person I discours'd with, seeming somewhat dissident of this Process by his unwillingness to attempt it, I desir'd and easily perswaded him at least to put himself to the trouble of trying it with the requisites to the work w^{ch} I undertook to provide, being at that time unable to prosecute it my self for want of a fit Furnace in the Place where I then chanc'd to lodge. And though at first we did not hit upon the best and most compendious way, yet during the Sublimation, he being suddenly surpris'd, as both himself and his Domesticks two daies after told me, with a fit of sickness, attended with very horrid and seemingly Pestilential Symptoms, was reduc'd to take some of this Medicine out of the Vessels before the due time, and upon the use of it found, as he told me, an almost immediate Cessation of those dreadful Symptoms, but not of the Pale- nesse they had produc'd. This first prosperous Experiment, emboldned us to give our Remedy the Title of *Primum ens Veneris*, which, for brevities sake, is wont to be call'd *Ens Veneris*, though I am far from thinking, that it is the admirable Medicine to which *Helmont* gives that name, at least if his *Ens Veneris* did really deserve half the praises by him ascrib'd to it. But such as Ours is, I shall now (as time and my yet incompleat Trials will permit) acquaint you with that Process of it, which (among some others) we are most wont to employ, as the most easie, simple, and genuine.

Take then of the best *Hungarian*, or if you cannot procure that of the best *Dantzick*, or other good Venereal Vitriol, what quantity you please, Calcine it in a strong fire, till it be of a dark Red, Dulcifie it by such frequent affusions of hot Water, that at length the Water that hath pass'd through it, appear full as tasteless, as when it was pour'd on it. Let this

*The Process
used by the
Author for the
making of
Ens Veneris.*

thus exquisitely dulcified *Colcothar*, when it is thorowly dry, be very diligently ground with about an equal weight of good *Sal Armoniack*, and let this mixture be put into a Glass Retort, and either in as strong a heat as can conveniently be given in Sand, or else in a naked fire, force up as much of it as you can to the top of the neck of the Retort, and this sublimation being ended, out of the broken Retort (laying the *Caput Mortuum* aside) take all the Sublimate, and grind it well again, that if in any part the *Sal Armoniack* appear sublim'd by it self, it may be reincorporated with the *Colcothar*, Resublime this Mixture *per se* in a Glass Retort as before, and if you please you may once more elevate this second sublimate, but we have not found That alwayes needful. And for the better understanding of this Process, be pleas'd to take notice of the following Particulars.

Diverse Particular Animadversions concerning the Preparations.

First, We have alwaies preferr'd such Vitriol as abounds with Copper, before our common English Vitriol, about the making of w^{ch}, those that keep the Copperas work at *Detford* are wont, as themselves have upon the place inform'd me, to use good store of Iron to increase the quantity of their Vitriol.

Secondly, If You be unwilling to loose the Phlegm, Spirit and Oyl of that Vitriol with which You design to make *Ens Veneris*, You may distill them away in an earthen Retort, or one of Glass well coated. But though it be well known that the distillation of Oyl of Vitriol requires a very intense and lasting Fire (so that unless you have need of the Liquors, the best way will be without any Ceremony to calcine the Vitriol in a naked Fire and open, yet afterwards it will be for the most part requisite further to calcine the *Caput Mortuum* in an open Vessel. For you must take notice, that unless the Vitriol be very thoroughly calcin'd, it will be very troublesome for you to dulcifie it, and sometimes we have observ'd that the *Caput Mortuum* which look'd Red and seem'd indifferently well calcin'd, hath been, almost like
Crude

Crude Vitriol dissolv'd in the fair Water which was pour'd on it to dulcifie it. The weight of the *Calx* in reference to the Vitriol, of which it was made, we cannot easily determine but we have sometimes found it necessary to reduce the Vitriol to lesse; perhaps much lesse then half its weight to make it fit for Dulcification.

Thirdly, The Water that hath been pour'd of the first and second time to edulcorate, the calcin'd Vitriol, may be filtrated and steamed away, till it come almost to the consistence of a Syrrup or Honey, and then may be put into a cold place to shoot; for after this manner we have sometimes had many very regularly figur'd Chrystals or Graines of Salt, I say sometimes, because sometimes also you may find it necessary to abstract all the Water, to obtain the Whittish Salt of Vitriol, which we have known us'd as a good Vomit, and which *Angelus Sala* none of the least sober of the Chymical writers doth highly extoll as an excellent Emetick in his *Ternary of Vomitive Remedies*, where he discourseth at large of the Vertues of it, and the way of administering it. And of this Salt, as Chymists are pleas'd to call it, we have had out of calcin'd *Copperas* a very great quantity, and have sometimes observ'd it to have been almost as deeply colour'd as the Vitriol it self was before Calcination.

Fourthly, We severall times tryed to sublime dulcified *Colcothar* with *Sal Armoniack*, in Retorts and Urinals plac'd in Sand, but whether by reason of the fixedness of the *Colcothar*, or because the Furnace we were fain to use, though no very bad one, was none of the best, we never could that way obtain any considerable Quantity of the desir'd Sublimate, and that which did ascend was but of a faint colour: wherefore, unless you have an extraordinary good Sand Furnace, if you will make use of Glasse Vessels, which is the cleanliest way, you will find it expedient to sublime Your *Colcothar* in coated Retorts with an open Fire, except you have

have the Dexterity to sublime in a naked Fire with Glass, retorts uncoated, which we have divers times seen perform'd by heating the bottome of the Retort by degrees, and then placing it upon Embers, with Coales round about it, but to be kindl'd at a distance from it; for if this course be watchfully follow'd, the Retort will be so well Neal'd, before it be reduc'd to endure any intense degree of heat, that after a while You may safely lay thorowly kindled Coales, not only round about it, but upon the top of it (which needs not to be done, till towards the end of the Operation) and thereby drive most of the Sublimate into one lump, and into the Neck of the Retort. And by this way you may sublime any Furnace upon a bare Hearth, but if you desire to give a more intense heat, you may lay first some warm ashes in an ordinary Iron pot, and haveing with them, and a few small Coals well kindled, Neal'd your Retort, you may afterwards prosecute the Sublimation in the same pot, which being once thoroughly heated it self by the Fire, will afterwards considerably increase the heat of it.

Fifthly, Though it be most commonly requisite to resublime the Sublimate, that comes the first time up, that the Salt and *Colcothar* may be more exquisitly mix'd, yet as far as we can guesse by some tryals, it will not be expedient to resublime it above once (or at most) twice. For in those Tryals we have found the *Ens Veneris* oftener resublim'd of a paler colour, than that which was resublim'd but once. And (NB.) perhaps, by further sublimations, the salt instead of being more intimately united with the *Colcothar*, may be almost totally sever'd from it, according to what we elsewhere in other cases declare.

Sixthly Of these Sublimates, that which hath the highest Colour, seems to be the best, as being most enrich'd with the *Colcothar*, from whence the redness proceeds. But at the first Sublimation I have often observ'd a pretty part of the

Sal

Sal Armoniack to come up first white by it self, especially if it had not been very diligently mix'd with the *Colcothar*. But at the second sublimation the Ingredients (which we have sometimes almost totally forc'd up without leaving a *Caput Mortuum* in the bottom of the Retort) will be more accurately mix'd and the Sublimate will appear Yellow, and and perhaps Reddish, of which sort we have sometimes had, when the Operation hath been very carefully manag'd.

Seventhly , How great a proportion of the Ingredients committed to Sublimation , will arise in the form of *Ens Veneris* , we dare not precisely define but Sublimate amounting to the fourth part of the whole Mixture, you will scarce, if you work skilfully, faile of.

Eighthly , We sometimes made a Sublimate of equal parts of pure *Sal Armoniack* and Salt of Tartar, both of them very thoroughly dry'd (for else they will be apt to yeeld rather a Spirit than a Sublimate ,) well ground together, and so sublim'd; And which this Sublimate instead of Simple *Sal Armoniack* we intended to make *Ens veneris* , but by some intervening Accidents and Avocations we were not able to perfect the Experiment , of which we nevertheless think it fit to give You this hint, because of the great Efficacy , which an excellent Physitian of my acquaintance , to whom I gave some of it, assures me he has found in it against Obstructions and some Distempers that are wont to spring from them.

Ninthly , When you are about to make Your first Sublimate, You may if You please, lute to the Retort, whereinto You put the Ingredients, a small Receiver to catch the liquor that oftentimes comes over. For that Liquor, though you will very seldome get much of it, yet may it be worth your preserving by reason of the Volatile & Urinous Salt where-with it will sometimes so abound , that it may passe for a weak Spirit of *Sal Armoniack*.

Tenthly , The *Caput Mortuum* that remains after the first

first Sublimation, may be put into a clean Glass, and set in a Cellar, where it will run *Per deliquium*, into a thick and high colour'd Liquor, very richly impregnated (as we elsewhere manifest on another Occasion) with the somewhat opened body of *Copper*, from whence if half those praises be true, w^{ch} even the best Chymists are pleas'd to give to *Copper*, it may be very well concluded to have deriv'd no small Vertues against Ulcers, & divers Affections, w^{ch} we are not here to insist on.

Eleventhly, We have sometimes doubted whether or no our *Ens Veneris* did really contain any thing of *Cypreous* or *Colcotharine* in it, partly, because of the fixedness or sluggishness of *Colcothar*, & of the *Copper* therein contain'd; & partly because that if *Sal Armoniack* be 2 or 3 times sublim'd by its self, its Flowers frequently enough will ascend Yellow, like the paler sort of *Ens Veneris*. But first, that *Sal Armoniack* is capable of carrying up even fix'd & sluggish Bodies seem'd probable to us, partly upon our incorporating & subliming it with finely powder'd Corals (from which, though but very little of it ascended, yet some of that little was no less red, then the Corals themselves before their being beaten) & partly upon our subliming it from *Copper*, both Crude & Calcin'd, since of either of those Bodies it carry'd up a little with it, as appear'd by the Blew Colour of some parts of the Sublimates.

And Secondly, that the reddishness of our *Ens Veneris* proceeded partly, if not altogether from the *Colcothar*, seem'd probable to us, not only by the tast, and some other Properties of it, but also by this, that having knowingly committed the first sublimate to a Fire too weak to resublime it; and having after some Hours, taken the Vessel out of the Sand, we found that the Fire, which we suppos'd was not strong enough to carry up the whole Matter, had rais'd the *Sal Armoniack* to the upper part of the Urinal in Flowers, that were either White, or but pale Yellow; whereas the remaining part of the Mixture, that lay in good quantity
in

that were either White, or but of a pale Yellow; whereas the remaining part of the Mixture, that lay in good quantity in the bottom of the Vessell, was of a deep Red, and a fragment of it of about the bignesse of a large Pease, being cast upon glowing Coals, and nimbly blown with a pair of Bellows, coloured the Flame with a somewhat greenish blew like that, but more faint, which we elsewhere have observed to proceed from the well opened body of Copper.

But those Tryals, I confesse, would rather increase my Doubts then lessen them, because in our *Ens Veneris* the Colour is not Blew, but Reddish, if I did not consider, that *Colcothar* is a body that consists of some other matter besides common Copper (as it is also far more difficult to reduce, though but in part, into a mettall, than is vulgar calcin'd Copper) and consequently when Corpuscles of differing Natures are by the *Sal Armoniack* elevated together, that which is not Metallinè, may with the assistance of the Fire's Operation alter the Nature of what is, and thereby produce a Colour differing from Blew. But to dispatch what ever further Tryals shall inform us, touching this Question, whether or no any true and reducible Copper do make an Ingredient in our *Ens Veneris*, yet there being in *Colcothar* other parts as well as those, that by Fusion you may reduce into a pure Mettall, and our Remedy seeming by its Somniferous property to partake of them, it will not be necessary to the giving our Medicine a Right to the Appellation I commonly choose of *Flores Colcotharis*, that in it there is something of the *Colcothar* carryed up, though possibly the quantity be but small, and not all reducible into a Metalline form: but perhaps the Question is not worth a longer Debate, it being sufficient to excuse the the name, and recommend the thing to such a Person as You, that *Colcothar* is employed in the making of it, and that the thing prepared is a noble Medicine, and hath some of the great Virtues ascribed to

Vitriol; whether that Minerall be an ingredient of it, or no:

The Dose and
Use of *Ens Ve-*
neris.

The Dosis of *Ens Veneris* may be very much varied: To little Children, we give sometimes one, sometimes two, and sometimes three Grains for many nights together, as we finde them able, without inconvenience, to bear the Operation. To persons of ripe Years we commonly administer four, five or six Grains at a time. But one, to whom we have given quantities of it to lie by him, tels us, That he hath taken to above thirty Grains at once without any inconvenience. We are wont to give it in two or three Spoonfuls of Sack, or other Wine, if the Constitution of the Patient, or the Nature of the Disease do not forbid it; and, in such cases, we give it in any Cordiall Liquor, that is temperate, or any other convenient Vehicle.

To Children it may be given in Beer, or Ale, or clear Posset-drink, but not in Milk. If the Patient hath supped at a seasonable Hour, we commonly administer it, when he is going to sleep. It works for the most part by sweat and a little by Urine, but more by sweat at the beginning, than after the body is used to it, yet to some bodies it proves so Sudorifick, that two Grains or lesse of it, have often made me sweat. That it hath once proved Emetick I have heard, but never observed it my selfe to provoke Vomits.

As for the Medicall use of *Ens Veneris*, divers great Physicians will perhaps think it were not despicable, though it were no other than oftentimes to prove a safe and moderately somniferous Medicine in Feavers, without having any thing in it of *Opium*, whose Narcotick power they finde as difficult to correct, as it oftentimes proves dangerous, when being not well corrected, it is administered without very great Circumspection. But-*****

To

To the 166th, 167th, 168th, 169th, and 170th Pages.

[*Finding among my loose Notes, together with those that do immediately concerne the Preparations of Sulphur and Harts-horn (delivered in these Pages) some other Particulars that may also serve, either to afford some light to Readers less skilled in Chymistry, or contribute somewhat or other towards the relief of some Patients, I am content to let those Papers go together, as I long since addressed them to a Friend.*]

HArts-horn, *Pyrophilus*, is a Heteroclite Body in Nature, which hath but few resemblers in the universe, for it grows to a considerable bulk like a Vegetable, and is (unlike most other Horns of Animals) at certain set Periods of time, deciduous, and though it be of a Bony substance, yet that middle part of it which differs from the rest in Colour, does (at least in grown Horns) much more resemble the Pith of some Plants than the Marrow of Bones: And yet this Plant-Animal (if I may so call it) does, when skilfully exposed to the Fire, afford the same differing substances, with the Blood, Flesh, and other parts of Animals. It is no wonder therefore, if Physicians and Chymists have hoped to find extraordinary Virtues in so extraordinary a Subject, of which we shall passe by the Usual Preparations, as not so pertinent to our present designe, insinuating only in the generall, That though even the more Vulgar Preparations, as well as that which Physicians have been pleased to call Philosophicall, afford us Medicines not despicable; yet these are much interiour to those Remedies wherewith dexterous Distillations are capable of presenting us, and certainly if we allow of the Chymicall Theory, (whose Truth in these Papers I question not) Harts-horn being generally acknowledged to be endued with properties very friendly to our Nature, and

Of Harts-horn;

t t 2

even

even those wayes of preparing it wherein the nobler and more active parts are not truly freed from those cumbersome ones that fetter him, and hinder them to display their powerful energies, proving yet oftentimes not unavailable. The Spirit and Salt of Harts-horn would be in more request, were not Men deterred from making tryals of it, partly by the over apprehended unpleasantnesse of the smell, and partly by the difficulties commonly met with, in its Distillation; the latter of which Deterrements hath so frightened even Chymists from distilling this Cordial Substance, that we have very rarely seen any, either Spirit or Salt of Harts-horn, save what our selves have been induced to prepare.

Three wayes of
distilling
Harts-horn.

There are three wayes proposed by the Authors I have met with, to distill Harts-horn: The one in coated Glas Retorts; the other in Earthen ones; and the third in *Glanbers* second Philosophical Furnace.

In the first of these wayes, some very skilful Distillers that have often phactised it, have so complained of their frequent breaking their Vessels by the copiousnesse and impetuosity of the Fumes that rush out of the Matter, when it once begins to be prest with a considerable heat, that I confesse to You ingenuously, *Pyrophilus*, they have hitherto frightened me from making tryall of that way; though I see no very great reason why, by a slow and regular gradation of the Fire, the mischances incident to this way of distillation may not (at least most commonly) be avoided.

To distill the Matter we discourse of in Earthen Retorts, is a safer way then the former, if the Earth be close and good, and have been sufficiently baked; as we find in the right *Hasian* Retorts, wherein we have known the Operation proceed very prosperously, though a considerable quantity of the Matter hath been distilled at once, but the Retorts made of Earth that is spongy or any other wayes unfit, or in whose baking Fuell hath been spared, are commonly (as Experience

perience hath informed us) improper for this service, wherein they are easily broken: Besides that, it is much to be feared that all Retorts made of Earth, except it be extraordinarily compact and baked, are apt to imbibe the more subtle and more penetrant parts of Harts-horn, and other volatile Substances distilled in them; which we have observed in some, wherein the Matter hath transudated quite through the substance of the Retort, and been manifestly discernable on the out side of it.

The third way of distilling Harts-horn, is performed by the Instrument described by *Glauber*, in his second Philosophical Furnace: But neither is this way without its inconveniencies: for besides that, if the Earth whereof the Vessel to be employed is made, be not of very good and well-baked Earth, it will be apt to crack, in so violent a Fire as is requisite in this way of Distillation, or else it will imbibe part of the finest Spirit it should transmit into the Receiver: And besides that it is difficult to work long this way, without letting some of the active part of the Spirit escape between the wide Orifice of the Retort and the Cover: Besides these Inconveniencies, I say, it is to be feared that the Matter being to be cast immediately into the Vessel, made red hot before-hand, it will receive a stronger *Empyreuma* or impression of the Fire, than it would do in the ordinary way of Distillation, wherein the fire being orderly and successively increased, much of the Spirit and Salt comes over into the Receiver, before that last degree of Fire is administered; which is requisite chiefly to force over the more sluggish and heavy Oyle, which therefore (to speak congruously to the most received Theory of Distillation) favors much more of the Fire, and is grown almost infamous for its adustion.

But notwithstanding these Inconveniencies, *Pyrophilus*, we have found these Retorts of *Glauber's* not unserviceable, when we have had occasion to Distill considerable Quantities

of such Materials, as were not so pretious, as to make the losse of a part of what they were to afford us, considerable.

And this Advertisement may take place, especially if you take along with you, what we have declared, touching the Wayes we substitute to avoid as much as may be, the newly objected Inconveniencies. But having in other Papers taken notice particularly enough of the Wayes we mean, I shall forbear to mention them in this place, though one of them may easily be made applicable, as Experience hath assured us, even to ordinary Retorts; for it is not difficult to apply to *These*, the perforated Receivers, which being almost of the shape of Pears, open at both ends, by holes of about two or three Inches Diameter (according to the capacity of the Vessell) may be with great facility taken asunder and made clean, and may, by the convenient Insertion of their Extremities into one another, be easily luted together (in a level) two or three, or as many of them, as necessity shall require: and then, provided there be applied to the remoter extremity of the last of them, some convenient Vessell open but at one end, the Receivers will very seldom break: The fumes that come over too copiously to be contained in one of them, passing freely thence into the second or the third (for we very rarely exceed three in all) which will be manifestly cool, and so, speedily turn into Liquor, the Fumes it receives, whilst the first Recipient is perhaps hotter then the Hand can endure: But of these Mechanicall Contrivances, elsewhere.

Now whereas *Glauber* prescribes to mingle with the Distill'd Liquors of Harts-horn rectified Spirit of Wine, to wash out the volatile Salt, and directs the Distilling again of both those Spirits (of Wine and Harts horn) together: his method of proceeding may be justly questioned: For first, dephlegmed Spirit of Wine will not so readily, in the way he supposeth, dissolve the volatile Salt of Harts-horn: And next, the Spirit this way drawn is not a simple Spirit of Harts-

Animadversions on some preparations of Harts-horn of *Glauber* and *Hartman*.

Harts-horn, but a compounded Liquor of the Spirit of Harts-horn, and that of Wine: the latter of which may possibly, in divers cases, rather impair than improve the Virtue of the former. For Spirit of Harts-horn, by reason of its opening and resolving, as well as Cordiall Virtues, is safely and successfully given in Feavers, wherein it is not observed to inflame the Blood, whereas Spirit of Wine in such cases is counted dangerous. And this brings into my thoughts a very questionable preparation of the experienced and ingenious *Hartman*, who much extolls, for the Worms in the Stomach, Spirit of Harts-horn in generall, but especially that which he is pleased to call *Essensificated* (that is¹, as himsele expounds it) with which its own fixed Salt, extracted with some convenient Water, and its volatile duely depurated, have been dissolved and united. For first, The fixed Salt of Harts horn hath been perhaps never yet prepared by any Man: and if Harts-horn doth yield a fixed Salt (as I dare not absolutely deny, but that out of many Pounds a few Grains may be extracted) it may well be doubted whether that Salt be endowed with specificall Virtues: And next, The Spirit of Harts-horn, if it be well dephlegmed, will not (for ought I could ever finde) dissolve its own Salt, unlesse assisted by the External warmth of the Ambient Air: Infomuch that I usually keep the Spirit and Salt in the same Viall, where they remain unmixed; and the Spirit that will dissolve any of its own Salt I account not sufficiently dephlegmed, but to have yet an Aqueous alloy, whereby the Salt is imbibed. And I remember that having once exquisitely rectified some Spirit of Harts-horn, and closed it up in a Viall, after divers moneths it let fall a considerable quantity of Volatile Salt, so far was it from being able, without the help of some peculiar way, to have dissolved more, had I cast more into it. I deny not that the Spirit of Harts-horn may by the mediation of heat, be brought to take in some of the Salt of the same Body: but of what use this violent

Præf. Chym. p.¹
190.

violent impregnation of the liquor can be, unlesse it be quickly administred, I do not yet understand; having often seen the Spirit let fall again in the cold, the volatile Salt it had dissolved by the assistance of heat.

A fourth way of
preparations of
Harts-horn u-
sed by the Aus-
thor.

And having thus, *Pyrophilus*, laid before you the difficulties we have met with in the above mentioned wayes of making of Spirit of Harts-horn proposed by Authors (neither of which we would yet have you altogether reject) I must acquaint you with our having attempted a fourth way, which when the matter to be distilled is not very much, I choose rather to practice than any of the other, as hitherto seeming more safe and free from inconveniencies. Take then (for Instance) two pounds of Harts-horn broken on an Anvil into pieces, each of about the bignesse of ones finger (for if it be rasped there is danger that it should emit its fumes too plentifully at once) and put it into a strong glass Retort uncoated, big enough to contain at least twice as much matter: Set this in Sand, and fit to it a pretty large and strong (either single or double) Receiver; then give a slow fire for three, four, or six hours, to send away first the Phlegme, and more fugitive parts of the Spirit: then encreasing the fire, but warily, and gradually for divers hours, drive over the Spirit (which is wont to drop down somewhat tinted) and the more volatile parts of the Salt; and at length intend your fire till the bottom of the Retort be glowing hot, and heap also at last quick coals upon the sand round about the Retort to give, as it were, a fire of Suppression, and so force over the more sluggish remaining parts of the Salt, and with it the Oyle: all which are to be afterwards proceeded with, according to the Directions given concerning the Spirit, Salt and Oyle of Mans Blood: which having been sufficiently insisted on before, will not (I suppose) need to be repeated now. Only it may not be impertinēt to advertise you, 1. That we have more than once had the bottom of the Retort melted, yet not broken; the melted

melted glasse being supported by the substrated sand. 2. That sometimes in Filtration, some of the thinner parts of the Oyle have unperceivedly passed through the paper with the Spirit and Salt, and have not been discovered, but by Rectification, wherein I have almost admired to see the Oyle with a gentle heat of a Lamp ascend to the top of a very tall head and body: touching which circumstance it may yet be further enquired, whether it proceed barely from the volatilenesse of the Oyleit self, or also from its being carryed up by the Salt and Spirit wherewith it was associated. 3. That by this way of distillation we usually have out of a pound of Harts-horn between four and five ounces, (seldome or never so little as foure, and often nearer five) or volatile Salt, Spirit, Oyle, and Flegme; (of the last of which, if the Harts-horn be not recent, there will be no great quantity) and when he distill'd two pound of the matter at a time, we found the operation to succeed altogether as well, and to yield us a fully proportionable quantity of Liquor.

The vertues of the Spirit and Salt of Harts-horn, which differ not much in Dose, or Efficacy, are probably very great in divers distempers, wherein we have yet made no tryal of them. For they are considerable in resisting Putrefaction, comforting nature, opening Obstructions, mortifying the Acidities it meets with in the blood; and, by rendring that volatile, promoting its Circulation, we have known considerable effects of it in Feavers, Plurisies, Obstructions of the Messentery, and Spleen; and chiefly (which perhaps you will think strange) in Coughs and Distempers of the brain, and nervous parts: in so much that I have, by Gods blessing, sometimes stopt very violent (but not inveterate Coughs) with this medicine in a few hours. And prescribing it to one who was almost daily assaulted with Epilepticall fits, a few Doses of it did in a pretty while at first make his fits come but seldome, and after, not at all: But whether he be perfectly cured not ha-

The Use and effects of the Spirit of Salt of Harts-horn, and the Dose of it.

ving heard of him of late, nor having had opportunity to make further tryal of the medicine in that disease, I am not certain. We prescribed it likewise, not long since, to a Person who had long laine both distracted, and almost bed-rid, and was in a short time strangely relieved by the use it, though not perfectly cured (perhaps because the Patient took but little of the medicine, we being then not well stored with it,) and on some that have been by Feavers rendred stupid, it hath had very eminent Operations: but for a further account of its vertues, I must referre you to the particular Narratives, I may, when we meet, give you by word of mouth: and till then it may suffice to tell you that it works chiefly by Sweat (and somewhat by Urine) without being observed to leave behind it such heat as divers Sudorificks are wont to do: only there must be care not to administer it when the *Prima via*, and passages are too much stuffed and choaked up by grosse Humours, left by agitating the blood, and putting it into a nimble Motion, it occasion greater Obstructions. The Dose is from five drops, or grains, to a drachme (ten or fifteen drops are wont to make me sweat) in Wine, *Carduus Benedictus* water, or any vehicle appropriated to the disease; only taking care that nothing acid be administred with it, because Acid and Sulphureous Salts mortifie, and disarm one another. *Hartman* commends it against the worms of the stomach, against which it may very probably be available, by reason of its penetrant, and saline nature, and its emnity to Putrefaction: *Glauber* writes, that the Oyle rectified from Salt of Tartar, cures Quartans, and inward wounds, and cures the pains produced by Falls, Contusions, &c. being administred from six to twenty drops to a Patient placed in his bed to sweat after it: but of this, my Experience will not enable me to say any thing. And I fear, *Pyrophilus*, that I have already too long entertained you about Harts-horn: and yet I fear too, that you expect that, before I forsake this Subject, I should say

say something to you concerning a much controverted particular relating thereunto. The Inquiry is, Whether or no, when it is distilled, the Salt dispose it self in the Receiver into the figures of Harts-Horn, the Affirmative is maintained by many Chymists, and a friend of mine who is very severe, and not at all credulous, having assured me that he himself had observed the inside of his Receiver overlaid with such figures or horns, I dare not deny, but that accidentally the particles of the volatile Salt may sometimes represent as well the shape of Harts-horns, as of divers other things. But for our parts, having several wayes, and not unfrequently-distilled that matter, we could never see the pretended Saline Harts-horns, so clearly as we thought we saw cause to esteeme that those who affirm'd they constantly saw them so distinctly lookt through the spectacles of prepossest Imagination: not to mention, that it is the usual method of nature in Salts to make the bigger Concretions of the same figures with the smaller grains, as we observe in Nitre, Rock-allum, &c. And the grains of the Salt of Harts-horn, though I have attentively enough considered their shapes, I remember not ever to have observed of a figure like that of the horns they came from; but it is the nature of volatile Salts to fasten themselves to the Receiver in various figures according as the degree of fire that urges them up, and other concurrent circumstances do chance to exact; and consonantly hereunto we have often observed the volatile Salt of the same Harts-horn to be very variously figured in the same Receiver: and I remember that not long since subliming some volatile Salt of Urine, it adher'd to the upper part of the vessel in figures, much liker Harts-horns, than ever I had seen their volatile Salt make up: so that unlesse we will merrily say, that the man whose urine was distill'd, had horns given him by his wife, wee must acknowledge that nature seems to give her self liberty to play in the Configuration of

Q. Whether in the distillation of Harts-horn, the Salt dispose it selfe into the Figure of the Horn.

volatile Salts, and that casualities have no unusual influence on them; or, to speak more properly, that the various degrees of Fire, the differing copiousness of the Fumes, and many other intervening accidents do keep those Configurations from being constantly regular: and I remember that a while since, filtering through Cap-paper a Tincture of glasse of Antimony, made with Spirit of Vinegar and Spirit of Wine, almost according to *Basilus*: the matter which remained in the paper (which was placed in a glasse funnel, and was of the same shape) did of it self, when it began to grow dry, cleave into the figures of trees, whose trunks, greater boughs, and smaller branches, were both for their shape, and proportion, as lively represented as if they had been drawn by the curious penfill of some skilfull Painter; which paper I shewed to some persons that beheld it not without wonder, and for ought I know I am yet able to shew it you: nor is this the only Instance I could give you if need were, if I had not trifled too long already to manifest at present, that now and then, Chance may make Nature seem to emulate Art.

That Bucks-horns may be substituted for Stags-horns,

But as long as I have dwelt, *Pyrophilus*, on this Subject, before I passe to another; I must not forget to advertise you, that in case Stags-Horns cannot be procured for the preparation of the above-mention'd Remedies, you may without much disadvantage substitute Bucks-horns in their stead: for almost all the trialls wee have had opportunity to make of the Medicines we have been lately discoursing of, have been made with Remedies, whereto Bucks-horns afforded Materials.

How to keep the Spirit and Salt of Harts-horn,

I had almost forgot, *Pyrophilus*, to tell you, That to keep the rectified Spirit of Harts-horn, Blood, or the like, is more uneasy, then any thing but trial would make one think; and yet to keep the Volatile Salt is more difficult, than to preserve the Spirit: for more than once, when I have kept these fugitive animal-Salts by themselves, they have penetrated the Corks,

Corks, and scarce left me in the well stopped Glasses any foot-steps of their having been there, and therefore those Chymists that are not strangers to these Salts, have taken much pains to no great purpose to keep them from Avolation, some of the recentest and ingeniousest are wont, that they may moderate their uncurbed wildnesse, to pour on them as much of some such Acid Spirit, as that of Salt of Vitriol, &c. as will produce any manifest conflict with the Volatile Salt, never considering, that as this course doth indeed devest them of their fugacity, so it doth in effect devest them of a great part of their Nature, and consequently of their peculiar Vertues. For I have elsewhere shewn, that the Saline Corpuscles, obtainable by the Fire from Urine, being united with a sufficient proportion of Spirit of Salt, will cease to be what they were, and with the Saline parts of the Acid Liquor, will make up a kind of *Sal-Armoniack*. But it is easier for me in this our case to shew that another mans Expedient is not good, then to substitute a good one; especially in this place, where for some Reasons I must not set down the way that I the best approve of: only I shall tell You, that my way long was (nor do I yet despise it) to preserve volatile Salts in their own rectified Spirit, which swimming over them, kept them from the immediate contact of the Air, and preserved them so well, that by this means I have secured even small parcels of the fugitive Salt of humane Blood for many Years.

[But since the Spirit and Salt even of this sort of Horns, will not, I fear, be found so easie for every Man, especially, if he be a Novice in Chymistry to procure in any considerable Quantity; and since the declared intent of my communicating to the Reader my Observations about these Spirits of Harts-horn, Blood, &c. was to furnish him with such Chymicall Remedies, that men may by their easinesse and cheapnesse be invited to provide them for the use of the Poor; I presume it will not be improper to present

him with a succedaneum or two, that may be easily enough obtain'd from Sal-Armoniack, though these Preparations have such Connexion with divers other Passages, wherewith they were Written to the Person I here call Pyrophilus, that, to avoid the too much dismembring those Papers, and to make these Processes the better understood, I must content my self to leave out those Particulars that can best be spared, hoping that the rest will be easily excused, at least by those who know how much some Chymists themselves have been deluded in their Trials of the divulged Processes, divers of which are either false or very uncertain, and others, though they should succeed, would give but a sophistical spirit, much of the obtained Liquor coming from the Distillable Concretes that must according to such Processes be mingled with the Sal-Armoniack, of which I could easily give instances, even out of modern and applauded Writers.]

Of the Spirit
of Sal-Armoni-
ack, and divers
attempts and
wayes of pre-
paring it.

The Spirit of Sal-Armoniack, *Pyrophilus*, hath such wonders ascribed to it by Chymists, that, if I should conclude these Papers touching Spirits of an Urinous nature, without saying something to you of that, you might think I had left the considerablest of them unmentioned; but as I the rather acquaint you with the little I know of it, because, though I have met with divers Authors that extoll it, I have scarce met with any that teaches intelligibly, and candidly how to prepare it, which perhaps most of them did not know themselves, so I hope you will exact an accurate account of it the lesse rigidly, because I can present to you but little on that Subject, besides the few Observations wherewith my own Curiosity has supplied me: having scarce ever (to my knowledge) seen any Spirit of *Sal-Armoniack* saye what my own Furnaces have afforded me, and therefore without presuming to set down solemn processes about a subject, wherein I have found a small variation of Circumstances hinder the operations made on it from producing uniform effects, I shall content

tent my self to give you as true an information as my memory will afford me of a few of my proceedings with this nice Salt, and the successes of them : only premising in a Word, that by *Sal Armoniack* I here mean the Factitious and Venal, consisting of Urine, Soot, and Sea-salt.

And first, according to the way proposed by *Glauber* (in the second part of his Philosophicall Furnaces) we distilled it out of an open Retort (with a Cover to clap on and take off as occasion requires) with a mixture of *Lapis Calaminaris*, and once we, that way, obtained a quantity of Liquor, which seemed exceeding strong, but before we could make any tryals with it, the Vial that contained it having been accidentally broken, we lost the opportunity of satisfying our selves of the efficacy of it: and having not long since attempted to make such a Spirit the same way, there came over indeed a Liquor which seemed to be the Spirit of *Sal-Armoniack*, but when wee came to Rectifie it in a gentle heat, the greater part of it to our wonder, coagulated in the Retort, whereinto it was put to be distilled, into a perfect *Sal-Armoniack*, (a pretty quantity of which I yet keep by me) and thereby betrayed the above-mentioned Liquor to have been little else then the *Sal-Armoniack* it self, forced over by the violence of the Fire, without having suffered any separation of its Ingredients. Nor is it by us alone, that the Proceſſe set down by *Glauber*, hath been unprofitably attempted, and yet perhaps it might have constantly enough succeeded with him, and the difference of the *Lapis Calaminaris* (in which we have observed much disparity according to the places it comes from) may have produced the complained of variety of Successes.

We also attempted to distill a Spirit from *Sal-Armoniack* (to pretermitt divers other tryals) by mixing it with equall parts of Salt of *Tartar*; but in this experiment we met with variety of successe, for having exquisitely incorporated the two Salts by the help of a little faire Water, we have divers times

times had the upper part of the receiver (carefully luted on to a somewhat large retort) all candied over on the inside, with Volatile Salts of severall shapies; and the Liquor afterwards forced over, hath sometimes remained long enough in the form of a very subtile and penetrant Spirit, and sometimes again, it hath in the very receiver almost totally coagulated it self into a lump of Crystalline Salt: and when we had mixt the Salt of *Tartar*, and *Sal- Armoniack*, without any Water or other moisture at all, our successses have been very like those above mentioned. Upon this occasion I dare not omit acquainting you with an Experiment, which yet I learn't not upon this occasion. Take of pure Salt of *Tartar*, and of good *Sal- Armoniack*, equall parts (let them be both very dry, or else you may loose your labour) and grind them very accurately together, though you be deterred from continuing that toyle, by a very subtile and fetid Urinous steam, wont to exhale from the mixture; these Salts being thus exquisitely incorporated, you must put them into a large Glasse Retort, to which you may fit a Receiver to catch a fetid Liquor that sometimes wee have observed to come over; then-administring by degrees a very strong Fire, the top and Neck of the Retort, will be lined with a pure white Sublimate, which seems to partake as well (though nothing neere so much) of the Salt of *Tartar*, as of the *Sal- Armoniack* and of its Qualities, and yet to differ from either: and though this Sublimate be farre enough from being the true Volatile Salt of *Tartar* so highly extolled by *Paracelsus* and *Helmont*; yet it is no ignoble Medicine in obstructions, and some other distempers: And I remember one of the most expert Chymists I know, having made tryal of some I presented him, told me he found such effects of it, as made him divers times very pressing and sollicitous for more. The Fetid Liquor that will come over wee have found sometimes to be very little, and at other times much more copious, without being able to discern clearly

clearly whence the disparity proceeded ; and the *Caput Mortuum* remaining in the Retort, by Solution, Filtration, and Coagulation, affords a pure Salt of greater Diuretical efficacy, than almost any I have hitherto met withall : Another way by which we attempted to attain a Spirit of *Sal Armoniack*, was, by accurately mixing two parts of it, with three or four of Quick-lime, whose virtue had not been impaired by being expoied to the Air. This mixture being distilled in a Retort, placed in sand, with a strong fire afforded us (together with some dry sublimate in the neck of the Retort, and, as I remember, a little volatile Salt in the Receiver) in a very strong and yellowish Spirit, so exceedingly penetrant, and stinking, that it was not easie to hold ones nose to the open mouth of the Vial wherein it was kept, without danger of being struck down, or for a while disabled to take breath, by the plenty and violence of the exhaling Spirits: But the Liquor forced over by this method, though exceeding vigorous as to its Qualities, was inconsiderable, as to its Quantity, and therefore we now chuse to vary a little this way of proceeding and let the Quick-lime lie abroad in the open Air (but protected from all other moisture, except that of the Air) for divers dayes; in which time the imbib'd humidity of the ambient Air would in some degrees flake it, and make it somewhat brittler than it was before; and the Lime thus prepared, being mingled with Salt-Armoniack, and distilled in all circumstances after the former manner, afforded us a Liquor so copious, and yet so strong, that we hitherto acquiesce in this way of distilling this wild Salt, as the best we have yet met with. But note, that we used, towards the latter end, to encrease the fire to that degree, by heaping up Coals on the upper part of the Retort, that the Mixture in the Retort hath been brought to flow. Note also, that though even the Spirit thus drawn persevered long in the form of a Liquor, yet yesterday coming to look upon a Vial of it, which we

x x

reserved,

reserved, to try what effect time would have on it, we found that about a fourth or fifth part of it had spontaneously coagulated it selfe into exactly figured graines of a ChrySTALLINE Salt, the Liquor swimming about it; retaining, nevertheless, a very strange subtlety: Which Observation concurring with divers others makes mee apt to doubt, whether or no this so celebrated Spirit of Salt-Armoniack be really much, if at all, other then the resolved Salt of Urine, and Soot, of which that body consists, somewhat subtiliated by the fire, and freed from the clogging Society of the Sea-salt, to which they were formerly associated and united; though I confesse it seemeth not improbable, by the great Energy which may be observed in this Spirit, when it is dextrously drawne, that the entire Concrete, and the Quick-lime, may afford it something that it could not receive from either of the Ingredients, whence the Mixture did result, as we see in *Aqua Regis*, which dissolves crude gold, though neither the Salt-Armoniack, nor the Peter, nor the Vitriol alone affords, by the usual wayes, Spirit capable of producing that effect. The great virtues, and uses of Salt-Armoniack, especially in Physick, I cannot now stay to treat of, but you will find them largely enough set down by *Glauber*; whose Entomiums nevertheless, must not be all adopted by me, who in this place mention the Spirit of Salt-Armoniack, but as a Medicine that is near of kin, and may serve for a *Succedaneum* to the Spirits of Hartshorn, Urine, Blood, &c.

But although the last mentioned way, *Pyrophilus*, be the least imperfect one we have hitherto met with, of distilling Salt-Armoniack, yet because you may sometimes need a Spirituous liquor impregnated with the activest parts of that noble concrete when you want either Retorts to distill in, or Furnaces capable of giving strong fires, I dare not omit to inform you, that, we have sometimes drawn over such a liquor of Salt-Armoniack after the following manner. Dissolve pure Salt;

Salt- Armoniack in a small quantity of fair water, then in a Cucurbit put such a quantity of strong Quick-lime powder'd, as may fill up a fifth or sixth part of the vessell, and water it very well by degrees with the former Solution of the Salt- Armoniack, and immediately clap an Alembick on the Cucurbit, and fasten a Receiver to the Alembick, closing the joints very accurately; and from this mixture, by the gentle heat of a Bath or a Lamp, you may obtain a Liquor that smells much like Spirit of Urine, and seems to be much of the same nature; and this volatile Liquor being once or twice rectified *per se*, with a very mild heat, grows exceeding fugitive and penetrant, and works by Sweat, and a little, perhaps, by Urine; and I remember that when I first made it, having been induced by some Analogicall Experiments, I had formerly made, to give it to one that had a Patient troubled with an extremely violent Cough, I had an account quickly brought me, that he not slowly, but wonderfully mended upon the very first or second Dose; and indeed the tryals that have hitherto been made of it, makes me hope that it will prove little Inferiour in efficacy to the other above mentioned more costly Spirits, scarce any of which being preparable by so safe, and compendious a way, if this Medicine emulate them in Virtue, the easinesse of the preparation (wherein little time needs be spent, and lesse danger or breaking vessels incurr'd) will much endear it to me. But, *Pyrophilus*, because I would assist You to make variety of Experiments about Volatile Salts, and because diverse tryals may be more conveniently made, when the Saline Corpuscles are in a dry form, then when they are in that of a Liquor; I will take this occasion to mention to You a way by whose Intervention a change on the fixt body employed about the newly mentioned Experiment, hath sometimes afforded me store of volatile Salt. This way was only to mingle exquisitely a quantity of Sal- Armoniack, with about thrice its weight of strong Wood-ashes. For the Spirit that

we this way draw out of a Retort plac'd in Sand, did quickly in the Receiver Coagulate into a Salt; and this Method was again experimented with like successe. And the Salt thus made, we found so extreamly subtle and volatile, that it seem'd to be much of the same Nature with that of Urine; and if it be indeed, (as probably it is) only the Volatile Salt of the Urine, and perhaps also of the Soot, whereof the *Sal Armoniack* consists, this may passe for a more compendious way of obtaining such Salts, than others that are hitherto wont to be practis'd amongst Chymists. But I will not undertake that this way of obtaining rather Salt than Spirit shall constantly succeed. Yet if you find it do not, I shall not perchance refuse You a better way. But if you could devise a Method (which possibly is not unattainable) of bringing over into a Spirit not the bare Urinous and fuliginous Ingredients of *Sal-Armoniack* but the whole Body; it may be, you would have a *Menstruum* that would make good, if not surpass even *Renanus's*, and *Glauber's* Elogies of the Spirit of *Sal-Armoniack*.

Of preparations
of Saline and
Sulphureous
Fetid Liquors.

The affinity betwixt Volatile Salts and Sulphurs, doth, *Pyrophilus*, as well as your Curiosity, invite me to acquaint you, with some of the Trials we have made about the Preparations of Sulphureous Fetid Liquors, which I am the more inclined to do, because, though I find mention made of some of them in Chymical Books, yet they are there delivered with so little incouragement, amongst many other processes of which it appears not that the prescribers made triall, that when I had distilled some of those Sulphurs, divers expert Chymists were very desirous to have a sight of them to satisfie themselves that such Liquors could be so prepared. The way of making the common Balsam, or Ruby of *Sulphur*, is too well known to need to be long insisted on. Only, because there is some little variety used by severall in the preparation, it will not perhaps be amisse to inform you that we are

are wont to make it by mixing about three parts of Oyle of Turpentine, with two of good Flower of Brimstone, and setting them on a strong Urinall slightly stop't in an heat of Sand, only great enough to make the Liquor with a little crackling noise (whencesoever that proceeds) worke upon the *Sulphur*, till it be all perfectly resolved into a Blood red Balsam which will be performed in six, eight, or ten Houres, according to the quantity of the Ingredients to be united; this Balsam, which is indeed in some cases no despicable Remedy, is by vulgar Chymists, according to their custome, very highly extolled, and sometimes employed in Distempers and Constitutions, wherein, instead of performing the wonders by them expected, its Heat doth more harme, than its drying and Balsamick properties do good: but yet apparent it will be, by what we shall say anon, that by this preparation, the Body of the *Sulphur* in somewhat opened, and therefore (as we said) in some cases the Ruby of *Sulphur* may prove no ineffectuall Remedy, which may probably be improved if it be prepared by bare Digestion in a very gentle heat, by which course we have prosperously prepared it, though not in so short a time, when we made it not in order to some other Medicine.

To Volatilize the *Sulphur* thus Resolved we tooke the Balsam made the former way in a few Houres, and putting it in a Retort, either with, or without fair Water, which is supposed to help to carry up the superfluous Oyle, we placed the Vessel in a Sand Furnace; and, with a gentle heat drawing off as much of the Oyle of Turpentine as would in that heat come over, we shifted the Receiver, and carefull luted on the new one; and lastly, giving Fire by degrees, we forced over a Liquor of a deep and darkish Red, extreemly penetrant, but of a smell so Sulphureous and diffusive of it selfe, that it was scarce to be restrained by Corkes, and was by great oddes stronger than that of the Ruby before distillation.

The like Experiment we tried in a Glasse head and body placed

x x 3

To Volatilize
the Balsam of
Sulphur.

placed in Sand, and through that way, likewise we obtained a Volatile Balsam of *Sulphur*, yet we found it too inconvenient to be equallable with the former. What long Digestions of this Liquor will do, to take away, or lessen its Empyreumatical and offensive Odour, we have not yet been by experience satisfied, no more than of its medical Virtues; though probably, the great penetrancy of the Liquor considered, they will not be languid.

Authors also prescribe the making a volatile Balsam of *Sulphur*, by driving over, after the above-mentioned manner, a Solution of Flower of Brimstone in Linseed Oyle, and this Remedy they highly extoll; but though it may probably prove a good Medicine, yet since they commend it but by conjecture, and not upon Experience, I see no great reason why it should be preferable to the other; for we find that expressed Oyles are much more apt to receive an offensive *Empireuma* than Oyle of Turpentine, which being much more volatile than they, requires nothing near so violent a heat to make it ascend; and, unlesse it be found that the Sulphureous particles are able to mitigate the corrosive ones, the distilled Liquor of an expressed Oyle may prove noxious in the Body. For by purposely (for tryals sake) distilling Oyle Olive, by it self, though not in a naked Fire, we obtained a Liquor of that exceeding sharpness, that it would (taken inwardly) probably corrode, or fret either the Stomach or some other of the internal Parts.

There is another way of preparing a Sulphureous Balsam, to which *Penotus* no ignoble Chymist, ascribes such stupendious virtues, that though I have not yet made tryal of it in Diseases, yet I dare not leave it altogether unmentioned; the process being briefly but this. Take good Balsam of *Sulphur* made with Spirit or Oyle of Turpentine, and having freed it from its superfluous Oyliness, pour on it well dephlegm'd Spirit of Wine, and therewith draw by affusion of new Spirit as
often

Penotus his Preparation of a Sulphureous Balsam with the Authors Advertisements upon it.

often as need requires a sufficient quantity of a Red Tincture, which by filtration and abstraction in *Balneo* must be reduced to a Balsamick consistence; this Liquor you may if you please by degrees of Fire drive through a Retort placed in Sand, and thereby obtain a volatile Balsam of very great penetrancy, and probably of no small efficacy; but the Triall I have made of this processe, gives me occasion to advertise You;

1. That, unless your Balsam be reduced to a stiff thicknes, and almost to dryness it selfe, the Operation will hardly succeed, we having fruitlessly digested for some months Spirit of Wine upon Balsam, whose consistence was somewhat too Liquid.

2. That as soon as the Spirit of Wine is sufficiently tinted, it ought to be Decanted, and succeeded by new; lest by too long digestion, instead of heightning its Tincture, it let fall that which it hath already acquired.

3. That upon a very slow abstraction of most of the Tinted Spirit in a digesting furnace, we once found the remaining Liquor not to be in the form of a Balsam, but to consist partly of Spirit of Wine; and partly of a seeming distinct Oyle, whereinto the Sulphureous Tincture was reduced. The Balsam of *Sulphur* thus made without Distillation seems likely to be an innocenter and nobler Medicine than the common Ruby of *Sulphur*, made with a hot and ill scented Oyle of Turpentine: and by this preparation may also appear the truth of what we formerly said, when we told you, that the body of the Sulphur was opened by Solution in Oleaginous Liquors: for out of the common thickned Balsam, as you may be informed by this process, well Rectified Spirit of Wine will, in a short time, extract a blood red Tincture, whereas by long digestion of Spirit of Wine alone upon pure, but undissolved, flowers of Brimstone, we could not discern any change of colour in the *Menstruum*; though I dare not deny the

the possibility of what some Authors affirm; who write; that Spirit of Wine very excellently Dephlegm'd, will in time, of it selfe, draw a Tincture from flowers of *Sulphur*, which Tincture they yet pretend not to make of a higher then a Lemmon colour. And, by the way, let me tell you, that our red tincture formerly mentioned is (if it be well made) so strong of the *Sulphur*, that probably it would make a very penetrant, and effectual outward remedy in Aches, and divers other cold distempers of the nervous parts; for it hath been already found, that good Spirit of Wine alone is one of the powerfulest Fomentations in divers cases of that nature; (inso-much that it hath been sometimes found to arrest the spreading Mortification of Gangrenes;) and therefore being so richly impregnated with *Sulphur*: which is, even without the assistance of so subtle a vehicle, very available in many distaffections of the *Genus Nervosum*; 'tis probable that the skillful association of two such active remedies may produce considerable Effects.

Of an Excellent Balsam of *Sulphur* made only with Oyl-Olive.
The common way of preparing it.

Take of pure flowers of *Sulphur* one part, of the best Oyle Olive four or five parts, mix them well together in a strong earthen pot, able to contain a much greater quantity of the ingredients than is to be put in it, set this vessel over a moderate fire of Charcoals, thoroughly kindled, till the Oyle, though slowly, have perfectly dissolved all the Flowers of *Sulphur*, which will (if you work it well) be performed in about half an hour, or an hour (according to the quantity of your Materials;) But you must have a great care, during the whole Operation, first, that the Oyle catch not fire, whereby it would not only be lost it selfe, but perhaps endanger the firing of the house; and next that the Mixture be kept nimbly, and constantly stirring from the first beginning of the Oyles action on the *Sulphur*, till the Solution be fully made; and the

Pot

Pot (having been taken off the fire) be grown cold again. The chief Signs whereby you may perceive, that, you have not erred in the Operations, are, *First*, if the *Sulphur* be perfectly dissolved in the Oyle, which you must often try before you take it from the fire, by taking up with the tip of a stick a drop or two of the Liquor yet in Preparation, and letting it coole on white Paper, or on your nail, whereby you may discern, when the Solution is perfectly made, by the deep Rednesse, and Transparency of the Liquor, and by its containing no more in it any undissolved Flowers of the Brimstone; *Next*, by the Consistency of the Balsame which ought to be neither too Liquid (as you will find it, if it hath not staid its due time on the Fire: nor too thick (as it is apt to become if you remove it not seasonably from the Fire;) but of the consistence of somewhat thin Honey; and lastly, by the smell which ought to be strong of the *Sulphur*, but not of the Fire; for though the Sulphureous Strink is, in this Remedy, to be expected, that Emphyreumaticall one, which proceeds from burning (and by skilfull nostrils may be easily discerned) is very possible to be avoided.

The *Dosis* of this Balsam, when it is to be inwardly used, may be from two to fifteen, or twenty drops, according as the greatnesse of the distemper, and chiefly the strength, and Constitution of the Patient shall require and bear. It may be given upon a fasting Stomack, either alone, or brought to the Consistence of Pills, or of a *Bolus* with powdered Sugar, Liquorice, &c. or else dissolved in any convenient Vehicle, wherewith its Oleaginous nature will permit it to mingle. Outwardly it may be administred either by bare Inunction of the part affected, or else by incorporating it with any other convenient Oyntment, or Playster: after which, we are wont to prescribe to have an application made to the part of two or three little Bagges filled with Sand, as warm as the Patient can easily endure it, and shifted as soon as either of them begins

to cool, that by this means, the Pores being opened, the Vertue of the Balsam, by being made more penetrant, may reach the farther.

I have been thus particular, *Pyrophilus*, in the mention of this Remedy, because though it seem but a slight and trivial Preparation, yet Experience hath given us better opinion of it, then I fear the slightheesse of the Preparation will as yet allow You. And indeed its Vertues, I am apt to think more then I have yet had occasion to observe, and therefore must referre you to *Rulandus* his Centuries, where they are often mentioned: but outwardly in Strains, old Aches, Bruises, and the like, it is wont to be very effectual; in the beginning of Fits of the Gout it hath several times (though not constantly) been prosperously applyed both to Mr. B. B. and divers other persons, and sometimes it hath been found not ineffectual even in the *Sciatica* it self. And as for Paralyticall distempers, I have had by a skilfull Physician an account sent me of scarce credible things which it hath therein performed: to which I shall only adde, that a while since, I had great thanks returned me on the behalfe of a faire young Lady, to whom I prosperously prescribed it against a great Tumor in her neck, which was supposed to be the beginning of the Kings-evil: But this Tumor was recent enough, which circumstance I think fit to specifie, because I fear that if the Scrophulous Tumor had been inveterate, the successe would not have been so good. Inwardly the chief Use we made of it hath been in Coughs, and Distempers allyed thereunto: but its Balsamicall nature, making it both healing and restorative (if I may so speak) of Putrefaction, makes it probable that its Vertues may be more extensive; to which purpose I remember that a while since a friend of mine tryed it with wonderfull successe *in mictu sanguinis ferè deplorato*, having first by a gentle heat reduced it to such a Consistence, as allowed him to make it up into Pills. But of the particular Cases;

Cases, wherein our Remedy hath been succesfull, no more at present, We shall rather subjoyn, That though this have been the way which we have the ofteneft employed in the making of the Balsam, yet wee must not conceal from You, that we have divers times met with Accidents, which frustrated our endeavours and expectations. For if the fire administred be too languid, the Solution of the *Sulphur* by the Oyle proceeds not well: and on the other side have found, that not only a strong heat is apt to burn the matter, or to make the Oyle boyl over, and perhaps take fire; but even that upon a very little excesse in the degree of heat, the Oyle and *Sulphur* would, before it could be expected, degenerate together into a heavy and viscous Lump (almost of the colour of the liver of an Animal) which coagulated matter proved afterwards exceeding difficult to be by the affusion of fresh Oyl dissolved and reduced to a due consistence. Wherefore we tryed to prepare this Balsam by putting the proportion of Ingredients formerly mentioned into a strong Urinal, which we placed in Sand, and making under it no more fire then was sufficient to make it slowly work upon the Flowers, (which did often during their Solution make a clackling noise,) we continued the Operation for divers (perhaps many) hours, at the end of which we found the *Sulphur* dissolved, and the mixture reduced to a Balsamick colour and consistence. So that if you distrust your dexterity to prepare this Balsam by the former way with a naked fire, wee must advise You to make use of this latter way, as that which is the safer, though it be the longer way of proceeding. Nay when we had leisure enough, we did, for tryals sake, prosperously attempt the Solution of Flowers of Brimstone, with common Oyl by the farre gentler heat of bare Digestion, and by that means obtained a Balsame perfectly free from adustion, but of somewhat too liquid a consistence, which may be easily remedied by the mixture of powdered Liquorice, Sugar, or any other such convenient Concrete. We

Other wayes of
preparing this
Balsam.

must also advertise you that this Balsam may also be prepared with Oyle of Nuts, of Poppy seeds, of *Hypericon*, instead of Oyl-Olive, or any other exprest Oyle, appropriated to the particular distemper against which the Physician intends to employ the remedy: only care must be had that the Specifick qualities of the Oyle be not so fugitive, as to be destroyed by the Ebullition requisite to the making of the Balsam; which if it be to be enriched with specifick virtues in relation to any particular disease, may perhaps be best prepared by the last mentioned way (of digestion) wherein the subtile Spirits that impregnate the Oyle are not in such danger to be dissipated by the Fire.

The knowingest Chymists themselves (*Pyrophilus*) are wont so much (and perhaps not altogether undeservedly) to extoll the efficacy of Antimony, that we were thereby invited, besides divers Preparations of it for internal use, to attempt the making of some remedies of it, that might also be externally applicable; and in prosecution of this design, we found that by boiling four or five fingers height of good Oyle of Turpentine upon very finely powdered Antimony, put with the Liquor into a strong Glasse Urinal, placed in Sand, the Oyle after some hours would grow exceeding high Tincted; and being gently in great part abstracted, would leave behind it a body of a Balsamick consistence, and a deep rednesse: which may, I presume, be applyed to resolve, and discusse hard Tumours, and remedy divers other outward Evils, with more effect than the simple Balsam of common *Sulphur* formerly described. And from this Antimonial Balsam abstracted to a stiffer consistence, wee found that Spirit of Wine would draw a Tincture, which I likewise suppose might prove a very powerfull Fomentation; though the Spirit we used (perhaps because it was not sufficiently Dephlegmated) did not in a few dayes attain to more than a very pale rednesse: but this Tincture being slowly freed from the most
part

A Balsam of
Antimony.

part of the Spirit of Wine, became of the consistence of somewhat liquid Hony, and of a deeper colour, thereby affording us a purer Balsam: which we have not yet, (being hindred by some accidents) attempted to bring over the Helm. Nor did we here desist, but by divers tryals found that the Antimonial Balsam, above mentioned, being put into a Retort, placed in Sand, and pressed by degrees of Fire, would at length emit Steams, which would condense in the neck of the Retort, and fall thence into the Receiver in sanguine drops: this volatile red Balsam (especially if by this volatilization the Antimony have lost its Emetick property) wee cannot but think endowed with more then ordinary Virtues, outward and perhaps inward too: considering the great penetrancy of the Liquor, and the Energy of the Mineral, with whose subtle parts it is richly impregnated, if it consist not mainly of them. But we are yet in prosecution of this Preparation, and therefore till we have seen how far we are like to improve this Remedy, We shall forbear any further mention of it, especially since we have already in this very Paper, given you as we suppose, sufficient prooffe, that We are more solicitous for your Satisfaction and proficiency, than for our own Reputation, (of being a severe Critick in estimating of Medicines) For otherwise we should not have been so indiscreet, as to acquaint you with any Preparation, of whose medecall Virtues we have not yet made much tryal, whilest we are not destitute of other remedies, whose efficacy hath been manifested to us by Experience. But we have often observed, that divers useful Chymicall Preparations are mentioned so obscurely, and unintelligibly by the Authors that write of them, or else are without any particular, or encouraging note of Distinction mentioned amongst a crowd of other Processes; some of which have perhaps already been found to be false, or trivial, and others of which may be rationally enough distrusted, that most Physicians, and Chymists themselves are deterred from attempting

Of the obscure
and Chrypticall
way of Writing
of Chymists.

to prepare those remedies, not so much because they seem unlikely to prove considerable, as because they are afraid that the Processes are false, or fraudulently set down, and consequently, that concretes of such a Consistence, Colour, Scent, and other obvious qualities, as are ascribed to the Remedies proposed, are not preparable by the publish't Directions.

And that you might see, *Pyrophilus*, what discouragements I have met with even from Artists themselves to keep me from trusting to Printed Chymicall Processes, I think it not amiss to mention here a memorable passage of the famous, and experienced *Alexander Van Suchten*, who is reported to have gotten more by the practice of Chymicall Physick then any of the Contemporary Professors of it: for he, towards the end of his Book of the secrets of Antimony (of which he clearly discloseth not any in that Treatise,) gives this account of his Crypticall way of writing; *Quod in hoc Tractatu nullum Recipe proposuerim, ob id factum est, quod vos seducere nolo; Recipe enim illa seducunt juniores Medicos: sed neque à Theophrasto ullum Recipe scriptum est, quod ad Medinam, quin occultum sensum habeat, & in quo nihil vel deerit, vel abundet, & hoc non fit sine magnis causis.* Wherefore make account, that, besides that such changes of the qualities of Bodies may afford much light to Naturalists, he doth Chymists no uselesse piece of service, that acquaints them with the successe of the nobler sort of Processes mentioned in Authors, though he should give them little or no account of the Virtues of the Remedies prepared by those Processes: but this I hope is not altogether our case; for besides that our Observations are likely to save You much trouble, and perhaps some mistakes, and mis-adventures: Besides that, (I say) we have had opportunity to observe such eminent effects of severall of the volatile Liquors described in these Papers, as may justly give us promising Expectations of the Properties of the rest, which are in their obvious qualities so neere of kin to them.

And

And this sort of Medicines having been found sometimes to do wonders, and generally to be safe (which of a few of the known operative, and not Specifick Medicines can be truly affirmed) I am apt to think, that he that shall bring these Remedies, in spite of their ill Scent, into the good opinion of Physicians may make no inconsiderable number of Patients beholden to him.

I should not, *Pyrophilus*, proceed to make You repent Your Curiosity to know my thoughts of the Urinous, and Sulphureous Remedies it hath hitherto made me treat of; were it not, that there yet remains something to be said, without which, all that hath been said, will scarce signifie very much towards the effectual recommending of those medicines to Your esteem and practise.

For I do not ignore, *Pyrophilus*, that not only the Generality of the Galenicall Physicians, but divers of the more eminent, and judicious of the Chymists themselves, have been pleased to condemne the internall use of Liquors driven through a Retort, by the violence of Fire, upon the scores of their being offensively Emphyreumaticall, and Stinking: among which sort of Liquors I cannot expect, that our Spirits of Blood, Harts-horn, &c. will escape the being reckoned. But forasmuch as the prosperous Effects I have had opportunity to see, of divers Remedies of that Nature, have given me for them rather an esteem, then either a detestation or contempt; I suppose it may prove no unseasonable, piece of Justice to the Spirit of Blood, and the other Noble, though fetid Remedies I have been setting you down; nor no unserviceable piece of Charity to Men, if in this place, and once for all, I spend some lines in endeavouring to rescue these criminated Medicines from the great prejudice they suffer under, and from a reputation, which whilst it render them more odious then even their smell can do, is likely to make men deny themselves the benefit of them.

Concerning the Emphyreuma of Chymicall extracts and their offensive-ness compared with the Galenicall and those which are commonly used by the Methodists.

And whether
the offensive-
ness of divers
Chymicall Me-
dicines proceed
from the vio-
lence of the
Fire, or the na-
ture of the Ma-
ter.

I might *here* on this Occasion call in Question, whether not only Galenists, but even many Chymists themselves, be not somewhat more afraid than they need be, of what they call *Emphyreuma*. But I will suspend a *while* that Question, and at present confesse to You, that I have sometimes doubted whether or no that stink which is generally called by the newly mentioned name, do alwayes, and necessarily proceed from the Impressions of a violent Fire. For to make a pure Spirit, and Salt of Urine, there needs nothing, but to let it in a well stopt vessel putrifie for a competent time (as we elsewhere teach) in a Dunghil, or any resembling warmth, (and that it self, perhaps, is not necessary to its Putrefaction;) and then to draw off an eighth or tenth part of the Liquor that first ascends by the gentle heat of a Bath. By which, or by the yet milder warmth of a Lamp-furnace, it may be sufficiently rectified, and brought to yield, besides the Spirit, good store of Salt. And since the Spirit thus made differs so little in Smell or Taste from those of Blood and Harts-horn, that most mens Noses are not criticall enough to distinguish them, (and We have sometimes taken pleasure to make Chymists themselves to mistake the one of those Liquors for the other.) It seems worth considering, whether or no the fetid and urinous Taste and Smell, which in these Spirits is said to be Emphyreumaticall, and to proceed from the Aduktion of the Fire, be not the Genuine Taste and Odour of the Spirituous & Saline particles of the mixed Bodies themselves, which they would manifest if they were copiously extricated (to speak in the Kings language) separated from the other *Principles* or *Ingredients* and associated into one Body, though without the violence of the Fire. For to distill the Spirit of putrified Urine, wherein the like Smell and Taste are eminent, there needs (as we said) no-greater heat then that of a Lamp-furnace, or of Horf-dung, (since in the latter of these only, Urine too long kept, and but negligently stopt, hath been observed to have lost its volatile Salt

and

and Spirit, before it was taken out of the Horse-dung. And such a Heat seems not great enough to impress an *Empyreuma* upon such a Liquor. For we see that most things distilled in the greater heat of a Bath, are commended by Physicians and Chymists, for their being free from Empyreume. And what Activity may be acquired by the subtle parts of a mixed Body, by the convening (if I may so speak) of such Spirituous Particles, disengaged from those other parts which clogg'd or imprisoned them, without any Empyreumaticall Impression, from any violent external Heat, may appear by the Chymicall Oyles of Spices. For though they be usually drawn by Chymists and Apothecaries, by the help of Water in Limbeckes, and though they have by us been drawn after another manner (which we may elsewhere teach You) with a much gentler heat (sometimes not exceeding that of an ordinary *Balneum*) yet these well Dephlegm'd Liquors, retaining so well the genuine Taste and Smell of the Concretes they were drawn from that they pass unaccus'd of Empyreume, are some of them much stronger and hotter than the Spirit or Salt of Mans Blood, or of Hartshorn. As may appear especially by the Oyle of Cinnamon, which if pure, is more penetrant and fretting, than any thing but tryall could easily have perswaded me. And lest you should object, that the Fire doth considerably contribute to the strength of these Liquors otherwise than by disengaging the Particles they consist of from the unactive parts of the concrete, and assembling them together; I must advertise You, that I have observed little lesse Heat and Penetrancy, than in divers of these, in some Liquors separated without the assistance of Distillation: as for instance, in the purer sort of the true Peruvian Balsam, and in another kind of natural Balsam, almost of an Amber-colour, which belonged to an Eastern Prince (who carried it up and down with him as a Jewel) whose Domesticks at his death sold it, whereby I came to procure some of it, and found cause to

wonder at its strength both upon the tongue, and in its Operation. But granting *Pyrophilus*, that the Volatile Remedies treated of in these Papers, may have their offensive Smell and Taste imputed to the Fire, yet perhaps Physicians would more slowly, and more tenderly censure the Remedies in question for their Empyreumaticall stink, if they did but consider, that they themselves scruple not to use (to name those among many others) *Senna* and *Scammony*, though the former be wont to gripe the Guts, and the latter have an Acrimony, Heat and Mordacity so unkind to the Bowels, that a few grains exceeded in the Dose turns it into poyson, because the ill Qualities of these Medicines, may by proper Correctives be somewhat mitigated, and the Good they do, doth more then countervail the Inconveniences that attend the use of them. For the very same Considerations, *Pyrophilus*, will be applicable to the excuse of those fetid Medicines, for which we Apologize: For though the *Empyreuma* or Impression of the fire, for which they are rejected, be the Quality, whose absence from them were very desirable, yet may that *Empyreuma* by dextrous Preparations, be in some measure corrected (insomuch that I have known highly rectified Spirits of Urine, by being digested for divers months in an exquisitely stop'd Glasse, brought to be of a Scent, which to me seem'd scarce at all stinking, and to others even pleasant) and the prejudice that may be justly feared from what remains, is advantageously recompenc'd by the benefits accruing from the efficacy of their more friendly Endowments. And in effect we find, that the Dogmatists themselves are grown not to scruple the administering the Spirit of Salt, though extorted (if it be of the best) by a much greater stresse of Fire, then is requisite to the Distillation of any of the Medicines we defend. And not only the famous *Riverius* (as we have elsewhere noted) extols the Spirit of Tartar, and Soot, which are yet sufficiently fetid and Empyreumatical, but severall other (and among those
some

some of our eminent English Physicians frequently use, and commend the Oyle of *Guaiaum*, forced through a Retort. And no lesse do divers learned Doctors esteem, and employ the Empyreumatical Oyl of Amber: Though (to note so much by the way) That he in divers cases far inferiour to the Volatile Salt, which (if the fire be skilfully administred) may at the same time, and by the same Operation be obtained. This Salt besides the Efficacy ascribed to it in the Convulsions of Children, having been lately found by Experience to be an excellent Medicine against the Elepsies, even of well grown Persons, being administred in the Dose of not above a Scruple or halfe a Drachme, in a due Quantity of Peiony water, or some other proper Vehicle.

And on this occasion You may also be pleased to take notice, that Foliated Gold, is ordinarily and without Scruple employed by Physicians, not only to cover Pills, but as a main Ingredient (though how properly I define not) of severall of their richest Cordiall Compositions extant in Dispensatories; and yet to how great a fire Gold is wont to be exposed before it be melted out of the Ore (wherein 'tis usually (at least as far as we have observ'd (blended with other metals, and Minerals) and to purifie it upon the Cupel; either with Lead or Antimony; he that is unacquainted with the Operations of Mineralists, and the Art of Refiners, will not easily imagine. And, *Pyrophilus*, to satisfie You yet farther, that the strong Impression of Fire in the Medicines, doth not alwayes make them so noxious as they are commonly reputed; let me desire you to take notice, that there is scarce any Medicament more generally given, and applauded, even by Methodicall Physicians than Steel, which is often administred in Substance, made up with other Ingredients, into the Form, either of Pills, or Electuaries. And yet we have wondred to see what great Fires, and violent Blasts of huge Bellows, moved by Water-engines, are used to melt Iron first out of the

Stone; and if it be to be farther refined into Steel (much of that used in Physick being factitious) a new violence of the Fire is requisite: And though after all this to make astringent *Crocus Martis per se* (which is accounted one of the best preparations of it) they are wont to keep *Mars* (as the Chymists speak) amidst reverberated flames, or in some Glasse-mans Furnace for many hours, yea sometimes for divers dayes; Yet this Medicine is with more successe than Scruple daily administred by learn'd Physicians, in Dyenteries, Fluxes, and other distempers where astringtion is required. And 'tis somewhat strange to me, that the having been exposed to no greater a Fire than is requisite to distill Spirit of Blood, or of Harts-horn, should be much urged against those Medicines, by those that scruple not to commend, and do almost daily and oftentimes successfully, prescribe the lixiviat Salts of Plants, and particularly of Wormwood, though these are not rightly made, but by the exposing the Concretes even to the violence of an incinerating fire. And as for the unpleasantnesse of the Smells of our Spirit of Blood, Hart's-horn, &c. besides that, to very many Persons there is no Odour so loathsome, as that of a Potion. We find that the Galenists themselves scruple not in the Fits of the Mother (which yet very rarely prove mortall) to repress (as men are wont to suppose) the unruly Fumes by the Smell of *Castoreum*, *Assa fetida*, and even the Empyreumatical Odour of the burnt feathers of Partridges: nor do they decline to use these homely, and ungrateful Remedies to Patients of tenderest Sex, and highest Quality, and indeed in dangerous cases I have known fair Ladies content to think it fitter to take down an ill Scented Medicine, than venture the having their own bodies in few daies reduced to worse Perfumes. And certainly we may justly say of Health, as no lesse than an Emperour said of the gain brought him in by Urine, That it *smells well, from what thing soever it comes.*

But,

But, *Pyrophilus*, if Your Nostrils were so nice, that they must needs be comply'd with, though with the hazard of impairing the Virtues of the Salts they are offended with, I could propose an Effectuall Expedient to gratifie them; and being now invited by so pressing an Occasion, I shall not scruple to annex something of it, and tell You, that if we may judge of the Virtues of the Spirit and Salt of Soot (which I am wont to make without addition) by their sensible Qualities: they must be much of kin to those of the Spirit of Hartshorn, and of Urine; (though these be animal Substances) And therefore having elsewhere more particularly, and by divers Experiments declared the affinity between these Salts in divers regards; it will not, I presume, be looked upon as an unusefull or unseasonable Hint, if I give You a summary, though but imperfect Account of what I remember my selfe to have done, in order to the freeing of the Volatile Salt of Soot, from that very offensive smell, which may possibly make many, even of those that need them, abominate those Medicines how piercing and Noble soever, which it blemisheth. The Processe is as followeth.

Wayes of taking off the Fetidnesse from Spirit of Urine, Hartshorn, &c.

Take a Quantity of well Deslegm'd Spirit of Wine proportionate to the Quantity of Salt, whose Odour You desire to correct, into this Spirit, drop as much Oyle of *Rhodum*, or of any other Odoriferous Chymical Oyle, as will suffice to make the Liquor as strongly scented as You desire it: shake the Oyle and Spirit well together, and if they were both well made, the latter will imbibe the former, and sometimes be thereby turned into a whitish Substance; with which if it smell not strong enough of the Oyle, You may by Agitation incorporate more Oyl, and if You judge the mixrure too strong already, You may dilute it at pleasure, by the affusion of more Spirit of Wine. This done put the Salt of Soot into a Bolt head, or Glasse Egge (according to the Quantity that You intend to sublime,) furnished with somewhat a long Neck or

Stem, and afterwards pouring on leasurely Your Odoriferous Liquor, You may with it wash down the Salt that is wont to stick in the Neck of the Glasse. After this, you must very carefully stop the Vessell with a Corke, and store of hard wax, if you cannot conveniently make use of an exacter way of closing it. This Glasse You must place in a Lamp-furnace, or some other, wherein You may give a very moderate heat, for that will suffice to elevate to the neck and upper part of the Vessel the pure white Salt of Soot, imbued (at the second time, if not at the first) with the Scent of the Odoriferous Oyle, which You employed about the Preparation.

This Experiment, *Pyrophilus*, may prove of that Use in Physick that it may deserve as well for its Noblenesse, as the watchfulnesse, which is requisite in him that makes it, to be illustrated by the ensuing

Observations.

Observations
concerning this
method of ta-
king off the
Empyreuma.

1. Then it is requisite that the Spirit of Wine be very good, For that which is not sufficiently Dephlegm'd, will not readily and perfectly receive into it selfe the Odoriferous Oyle, wherewith it is to be performed. Nor would every Chymicall Oyle, although it were well scented, be fit for this Preparation for divers of them as Oyle of Turpentine, and Oyle of Amber will not sufficiently mingle with Spirit of Wine, unlesse they be previously subtilized after a peculiar manner.

2. The Proportion betwixt the Spirit of Wine, and the Oyl that it is to be dissolved in, 'tis not easie to determine; for a lesler Quantity will suffice of some Oyles, than of other. And the Proportion of them must be varied, according as You would have the sublim'd Salt to participate more or lesse of their Odour, and other Qualities.

3. Great diligence must be used in closing the top of the Glasse, because of the great fugacity, and subtlety of the Salt, whose Avolation is to be prevented: But then much greater care is to be had, that the Heat be not too strong, but as equall

as may be, and much inferiour to the Moderate heat of an ordinary Chymical *Balneum*. For 'tis scarce Credible, how easily this unruly Salt will be excited either to make an escape at the mouth of the Glasse, or to break it in pieces. And I remember, among such other Accidents which have befallen us in the Preparation of this Odoriferous Salt, that having once set some of it to sublime from a perfumed Chymical Oyl, though we administred so gentle a heat, that wee thought the Vessel out of all danger of being broken, or found open. Yet in a short time the fugitive Salt did with a great noise blow out the Cork that was waxed to the top of the Vessel, leaving in the bottom nota limpid Oyle, but a Liquor of a red colour, and a Balsamick Consistence. But if the Glasse be wide enough to allow these fumes competent Room, and if the heat be warily administred, the Sublimation may be well enough performed.

Of the Medicinal Quality of this Aromatical Salt, *Pyrophilus*, we have not yet had opportunity to make tryall, but some esteem may be made of them by calling to mind the Virtues of the simple Salt of Soot, and considering the Nature of the Liquors, from which in this our preparation it hath been Sublimed. The Principal if not the only thing, that seems to be feared, is, that the Salt of Soot being it selfe hot, and Chymical Oyles being for the most part eminently so too, our Salt may prove unfit for Men of Hot and Cholerick Complexions, and in such distempers, as proceed from Excess of Heat. But then it may be considered in the first place, that the Salt of Soot, being of an extreemly aperitive, resolving, and Volatile Nature, and carrying up with it in Sublimation only the more fugitive parts of the liquor from which it is sublim'd; It is very likely that the heat produc'd by a Medicine, which by reason of its fugacity would stay but a very short time in the Body, will not be so lasting as that of ordinary Sudorificks, which are nevertheless often administred with good success, even in hot Diseases.

Second-

Of the Medicinal quality of these Aromatical Salts.

But whether or no this Aromatick Salt be a safe Medicine in all Hot Bodies and Diseases, it seems very probable, that it will prove a very powerfull Remedy in those Distempers for which it is proper. For first, whereas Spagyriste have, with much study, but without much successe, endeavoured to make Oyles capable of being mixt with other Liquors, by depriving them of their oleaginous forme, in which *Helmont* himself complains that they are offensive, we have, by our Preparation, their finest parts associated with the penetrant and volatile Salt: by whose assistance they are not only fit to communicate their Virtues to Liquors, but assisted to penetrate exceedingly; and perchance also, thereby to obtain such an access to the innermost parts of the Body, as is seldome allowed to Vegetable Medicines. Secondly, We may have by this Preparation one of the most noble and volatile Salts of the World, not only free'd from its stink, but imbued with the Odour, and perhaps divers of the Virtues, of what Chymicall Oyles we please. And since these Chymicall Oyles are by Chymists and Naturalists thought to contain the most noble and active parts of the Vegetables whence they have been distill'd; and since also the Salt of Soot sublim'd from them, carries up with it the finest parts of these Oyles, Why may it not be hoped, that no small number of distinct Remedies may be afforded us by this single Experiment? These Remedies too may be the more acceptable both to Physicians and Patients, because they have not in them any thing that is Minerall, and notwithstanding their great Penetrancy and Efficacy have in them nothing of Corrosive, as many of the Saline Remedies prescribed by Physicians in their Dispensatories. And thirdly, That the Salt of Soot thus sublim'd may be also enriched with the *Sulphur* or Balsamick part of the Spirit of Wine, which was employed about its Preparation, may appear probable enough to him, that shall examine, by his taste and otherwise, such rectified Spirit of Wine as has

had a sufficient quantity of Volatile Salts sublim'd from it. And how Balsamick a substance is diffused through pure Spirit of Wine, may be guess'd at by the great change which is made in the Caustick Salt of Tartar, when it is so dulcified as to make that Excellent Medicine, which *Helmont* extolls against inward Ulcers, and calls *Balsamus Samech*; which if one had the abstruse Art of so preparing the Salt and Liquor, as to fit them for Conjunction, might be made only by distilling very frequently pure Spirit of Wine from very fine Salt of Tartar. For by this means the fixed Salt, retaining the Sulphureous Salt or Balsamick parts of the Spirit of Wine, (as may appear by the Aquosity of the Liquor that comes over the Helm in this Preparation) is thereby so deprived of its caustick taste, that when it will rob no more Spirit of Wine, but suffer it to be drawn off as strong as it was poured on, it will easily in a moist place run *per deliquium*, into a liquor not of a Caustick, but Balsamick (and as it seem'd to us a pleasant) Taste.

And whereas, *Pyrophilus*, we have complained of the Difficulty we have met with, to mannage the unruly Salt of Soot, and keep it from breaking Prison; we must, to make this Experiment be more practicable and useful, advertise You, that you may, if You please, instead of Salt of Soot Aromatize that of Harts horn, or mans Blood. And I might adde, that a very ingenious Friend of ours Dr. *N.N.* has lately Practised yet a more easie and preferable way of preparing Medicines of this Nature: But though I have partly tryed his Method, and found it to succeed well enough; yet since I had it but by communication from him, and that he makes a considerable Advantage of it, I must forbear imparting it to You, till I shall have obtained his Consent to disclose it.

I know not, *Pyrophilus*, whether I shall need to adde, That of these foetid Remedies, which are Volatile, and somewhat Sulphu-

Sulphureous, as I chose to mention to You but a few, to comply with my present haste, which would not allow me to insist on many : so in what I have delivered concerning these few, I have set down Particulars the more fully and explicitly, because I find the Doctrine of Volatile Salts (though in my poor judgement worthy of a serious Enquiry) perfunctorily, and indistinctly enough, handled by the Chymicall Writers I have yet met with, which made me the willingier to contribute the few Observations I could readily find of those I have had opportunity to make about them, towards the Illustration of so important a Subject, of which having elsewhere spoken in relation to Physiology (as these fugitive Bodies belong to the Commonwealth of Salts) I thought it might not be unacceptable to You, if I also considered them a while in relation to Physick, and presented You with some hints concerning their Medicall Uses.

[*To the 156th Page, where the Author promises a Declaration, how he would have his Praises of Medicines understood*].

AND now, *Pyrophilus*, having finished what I thought fit to adde (at present) in the past APPENDIX, I should likewise put an end to the present Exercise of your Patience, but that this being my first Treatise written to You concerning Medicall Matters, and not being likely to be the last which you will meet with among the Papers design'd You, I think it requisite, and not unseasonable to declare to you here once for all, with what Eyes I desire you should look upon what I have written, and shall write, to you concerning matters of that Nature. And first, I must advertise You that I am not so much a Mountebank as to recommend to you the Remedies I mention as certain Cures in the Cases wherein they are proper. For he must have been extraordinarily happy, or very much unacquainted with the Practice of

Physick, that has not found, that even those Medicines which are most celebrated by the best Authors, both Galenicall and Chymicall, do sometimes prove ineffectuall as well as often prosperous; and the Remedy prescribed by the same Physician to twenty Patients sick of the same Disease, has more then once been observed, though it have succeeded in nineteene, to faile in the twentieth. And indeed the Causes of Diseases, the Constitution of Patients, and the Complications of Distempers are so very various, intricate, and obscure, that it is extreamly difficult even for the most knowing and experienced Physician to make an accurate, and constant Experiment in the Therapeutick part of Physick; and consequently such Experiments are much lesse to be expected from Me, whose Condition as well as Disabilities forbid me to make the Practice of Physick my businesse, and allow me only to administer it occasionally, either to my own particular Acquaintance, or to such poor people as are not able to gratifie Physicians, or such as I meet with where there are not any: And thereby I am reduced to learn the Virtues of divers of the Remedies I have prepared by very few or none of my own immediate Trials, but the Relation of Physicians, who do me the Favour to administer them for me. And therefore, though I endeavour to put them into the hands of faithful, as well as ingenious men; Yet not being allowed to be my self a constant eye-witnesse of the Effects they produce, I must here for all these reasons solemnly professe to you, that as I do not set down Medicinal Experiments, with the same positivenesse that I do Physiologicall ones, so I do not intend to venture the repute of being a faithful Relator of Experiments, upon the successe of any Medicinal Receipt or Proceffe.

Yet in the next place I must tell You, that You would perhaps do Me but right, to think not only that the Chymicall preparations of Remedies are, if you understand them aright,
candidly

candidly set down, though the Virtues ascribed to them do not constantly upon all Tryals display themselves; but that I have not rashly and inconsiderately, or upon uncertain Rumors recorded the vertues of particular Remedies, which may be good, though they be not infallible. It being sufficient to make a Medicine deserve the title of Good, that it be often (in some degree at least) successfull, though now and then it prove not availeable; especially if it be otherwayes so safe and innocent, that even when it proves not prosperous, it weakens not nature, nor is otherwise noxious. And we must not, *Pyrophilus*, be so timid as to suffer our selves to be perswaded, that if a Patient miscarry after the use of the Remedies, the fault must necessarily belong to the exhibited Medicine. For oftentimes Nature will in spight of Remedies make a *Metastasis* of the peccant matter, and so empair the Condition of the patient; and much oftner before death, the Conflict of struggling Nature, and the conquering Disease doth manifest it self in horrid and dreadfull Symptomes, which some envious or ignorant Doctors (for the more learned are wont to be more equitable, and lesse partiall) injuriously impute to the Chymicall Remedy, given before the appearing of those Symptomes; never considering that the like Accidents are wont to attend dangcrous Diseases, and dying persons, where Galenicall Remedies only, and no Chymicall ones at all, have been administred. And that divers of the most eminent, and Methodicall of our Modern Physicians scruple not to use frequently both *Crocus Metallorum*, *Merc. Dulcis*, and some other Chymicall Remedies, and to impute the miscarriages of the Patients that use them to their Diseases; though not many years since, all the frightfull Symptomes accompanying the dying persons to whom they had been exhibited, were confidently imputed to those Medicines. To which let me adde, *Pyrophilus*, that oftentimes it may be very just to prize an Empiricall Remedy more then a Galenicall, though the

Divers Disadvantages of Chymicall and Empiricall Physick in the way of Ministration.

Methodist and the Empirick have each of them by his respective Remedies, performed Cures of divers Patients in the same Disease; *partly* because Empirical Chymists are seldome resorted to but in desperate cases, or till Nature be almost spent, either by the violence of the Disease, or the unprosperous operation of the Medicines employed to remove it; and *partly*, because the Methodist helps his Remedies by premising the wonted Evacuations (by Vomit, Seige, or by Phlebotomy) by varying them according to Emergent Circumstances, by skilfully and seasonably administering them, and by strict rules of Diet; whereas the Empirick oftentimes useth but a single Remedy, and usually without premising general Evacuations, exhibits it not to the greatest Advantage in relation to him, and other circumstances, and is much more indulgent to his Patient in point of Diet: So that when an Empirick, and a rational Physician do both in severall Patients cure for instance the same Plurisie, the Disease may be very often judged to have been removed in one of the Patients chiefly by the Physician, and in the other by the Remedy.

That Chymical
Processes stand
more in need
of clear Relations,
than Galenicall.

In the third place, *Pyrophilus*, I must advertise You, that though I mention more Chymicall Remedies then Galenicall, yet it is not out of any partiall fondnesse of the former, and much lesse from any undervaluation of the latter; but *partly*, because Chymicall processes being wont to be more unfaithfully, or obscurely, set down by Authors then Galenicall Receipts, I thought it might save You some labour to receive from me a frequenter account of those, than these; and *partly*, because in many Chymicall preparations, divers considerable Changes being to be wrought upon the Concretes to be prepared by them, there is oftentimes so much of Philosophy to be learned by such Processes, that the successe of them may prove instructive to you, though it should acquaint you with their Truth only, as they are Chymicall preparations, and not

as they are Medicinal Receipts. But otherwise I love to look upon both Chymicall and Galenicall Remedies, with an impartial eye, and think that neither the former ought to be despised for the latter, nor the latter for the former; for as Chymicall Remedies have commonly the advantages of being more durable, lesse clogging by their quantity, and lesse nau-seated by Patients; so Galenicall Remedies have, when they are of equal Efficacy, the Advantages of being more cheap, (at least quantity for quantity) more procurable, and sooner prepared. And such is the variety of Cases arising from the variety of Constitutions and Distempers, that in some of them the former sort of Remedies, may be more proper, and in others, the latter may seem requisite; and in some also, both sorts may alternately be so usefull, that neither of them can well be spared.

In the fourth place, *Pyrophilus*, let me advertise You, that divers Chymicall Remedies, and some Specificks also which are not Chymicall, have seem'd upon tryal lesse effectual than indeed they are, because they have been tryed by such Physicians as weaken their Efficacy by not administering them as they should. For some Physicians will never exhibite a Chymicall Remedy, till the Patients strength hath been almost tired, if not quite spent with the unprosperous use of divers others clogging and debilitating Medicines. Others are so diffident of Chymicall Remedies that they never dare to exhibite them in a full Dose, nor by themselves, but will blend a small quantity of a Chymicall Medicine or a Specifick with other Ingredients, which either constitute with it a Medicine of new qualities resulting from that mixture, or at least much clog or enervate the activity and virtue of the Chymicall or Specifick Ingrediens: by which, even in so inconsiderable a Dose, these distrustfull Doctors dare yet require that great matters should be performed. Of which injurious way of administering the Remedies I recommend to you

Pyrophilus,

Errors in the
Time and Dose
of Chymicall
Remedies.

Pyrophilus, I do not causelessly desire you to beware: as I may hereafter have occasion to shew you by particular instances of the Reasonableness as well of this Advertisement as of the others which I either have given You, or shall give you, in this and other Papers. And another sort of Physicians there is, who are of so despondent and rather partial an Humour, that if a Chymicall Remedy or a Specifick, do not presently performe the hop'd for Cure, though they find, that even upon their disadvantageous manner of administering it, it doth good: yet they will quickly desist from the Use of it: And because it doth not do Wonders, they will not scruple to affirm that they have tryed it and found it do nothing: whereas they are wont to continue their own Courses of Physick without discouragement, though it be usually some weeks before the Patient find any good by them, and oftentimes (as numbers of the printed Observations of Physicians as well as daily Experience testifie) the Patient is by the tedious Course of Physick he has gone through, very little better'd, if not much impair'd. Which I speak, *Pyrophilus*, not with an Intention to disparage Physicians in generall, the most learned and ingenious of them being free enough from the Partiality I here take notice of; but to keep good Remedies from being disparaged by the envious or unskillfull tryals of bad Administers: And though indeed some Chymists are so vain-glorious or unwary, as to promise that the Operation of their Remedies should be as well suddain, as effectually; yet if the Medicines themselves be found availeable, although not swiftly so, that slownesse ought to make us but condemne the Boastings of the man; not reject the use of the Remedies.

And in the last place, *Pyrophilus*, I must Advertise you, not to expect that every one of the Remedies I commend should be Physick and Physician too: I mean, that it should of itself suffice to perform the Cures of those Diseases against which it is commended. For Medicines are but Instruments

in

in the hand of the Physician, and, though they be never so well edg'd and tempered, require a skilful hand to mannage them: and therefore I cannot but admire and disapprove their boldnesse that venture upon the Practice of Physick, wherein it is so dangerous to commit Errors, barely upon the confidence of having good Receipts. For though by Conversation with eminent Physicians, I have found the learnedest of them to disagree so much about the Nature and causes of Diseases, that I dare not deny but that he may prosperously practice Physick that either ignores or dissents from the received Doctrines of the Schools concerning the causes of Diseases, and some other Pathologicall particulars; yet I cannot but dislike their boldness who venture to give active Physick, either in intricate or acute Diseases, without at least a Mediocrity of knowledge in Anatomy, and so much knowledge of the History of Diseases, as may suffice to inform them in a competent measure what are the usual Symptomes of such a Disease, what course nature is wont to take in dealing with the peccant matter, and what discernable alterations in the Patients Body do commonly forerun, and thereby foretell, a *Crisis*, or otherwise the good or bad event of the Disease. To all which is to be added some tolerable measure of Knowledge, not only of the *Materia Medica*, and the chief wayes of compounding severall Ingredients into Medicines of severall Forms and Consistencies, as circumstances may require; but also of the orderly and seasonable administration of the helps affordable by them. These particulars, *Pyrophilus*, might easily be enlarged on; but having neither the leisure nor designe, to handle them commonplace-like, I shall only give you this account of my requiring in the profess'd Practiser of Physick some knowledge both of the *Materia Medica*, and the Method of compounding and administering Remedies, that (excepting perhaps the *Arcana Majora*, as Chymists call them) even the best Medicines by being unseasonably

That a competent Measure of Knowledge is absolutely necessary to a Practiser of Physick.

or preposterously administred, especially in acute Diseases where Natures motions are to be diligently watcht, and seconded, may do a Patient as much harm as the orderly and skilful administration of them can do him good. And that he that has nothing but one good Receipt for a Distemper, and knows not how to vary it by adding, omitting, or substituting other parts of the *Materia Medica*, as urgent occasion shall require, may oftentimes find himselfe reduced either to suffer his Patient to languish helpless, or to venture by curing him of one Disease to cast him into another. For sometimes the Patients constitution makes the Medicine prescribed by the Receipt unfit to be administred; and sometimes too, the Disease, for which the Receipt is proper, is in the Patient complicated with some other Distemper which may be as much encreased by the Specifick, as the other Disease may be lessened. I know for instance some eminent men that are wont to Cure very stubborn Venereal Distempers, by a Chymicall preparation (which some of themselves have been pleased to disclose to me) of the *Indian Plants*; *Sarsaparilla*, *Guaiaecum*, &c. But if these Men met with Patients, such as those which *Eustachius Rudius* mentions himselfe to have often met with, who upon the use of the least quantity of *Guaiaecum*, though corrected with cold ingredients, were wont to be presently affected with such sharpnesse of Urine, and Inflammation of the parts, to which Urine Relates, as hazarded their lives; they would be reduced, as well as our Author confesseth himselfe to have been, to have recourse to *Mercurial* or other Remedies. To which we may adde, that the use of *Sarsaparilla*, and *Guaiaecum* is generally forbidden by the warier sort of Physicians, in those Patients, whose Venereall Distempers are complicated with heat or Inflammation of the Kidnies or Livers. And sometimes also it happens, that the very outward form of the Medicine prescribed by the Receipt is not fit, or perhaps possible to be administred. For, not to mention that
divers

digers Patients can retain no purgative Physick exhibited in
 the form of a Potion: and some others are as apt to Vomit up
 what ever is given them in the form of Pills; not to insist on
 this I say, I shall content my self to relate to you a memorable
 Case that hapned a while since to a Physician of my acquaint-
 ance. He was called to a lusty young Woman, who upon an
 accidental but violent Cold was suddenly taken with such a
 Constriction of the parts inservient to Speech and Deglu-
 tition, as made her altogether unable either to speak or swal-
 low any thing at all: and having thus continued some dayes in
 spight of Glysters or other Remedies prescribed by a very
 Learned Physician, and in spight of Endeavours to excite Vo-
 miting, by making her hold emetick things in her Mouth;
 the poor Woman was in great danger (when my acquaintance
 came to her) of perishing for hunger. What in this case could be
 expected from the best Remedies that must necessarily be ta-
 ken in at the Mouth? Wherefore the Physician finding her
 yet strong enough, and without Feaver, and yet her case al-
 most desparate, did as judiciously as luckily prescribe a Gly-
 ster, wherein to ordinary ingredients were added (as himsele
 a very few dayes after told me) about four ounces of the In-
 fusion of *Crocus Metallorum*, with an advice that it should be
 kept in as long as possibly She could, and by this Medicine,
 Nature being sufficiently irritated, there quickly followed
 upon it some violent Vomitings, and upon them a liberty
 both of Swallowing and Speaking. [And since this, a young
 Gentleman and Fellow-traveller of mine, had the Organs of
 deglutition so strangely weakened without any manifest cause,
 that though he were able to make me a Visit, and acquaint
 me with his Case yet he was very apprehensive, he should in
 a very few Dayes be starved, and being unable to swallow
 Remedies, had quickly perished in despight of the *Arcana*
Majora themselves; had he been master but of such of them
 as (like those wont to be magnified by Chymists) must be

b b b 2

taken

taken into the body ; if a very happy Physician to whom I directed him, had not by a very Efficacious and Specifick Medicine externally to be applyed, seasonably rescued him from so unusuall and desparate a Case.] But, *Pyrophilus*, as I would not upon the score of good Receipts have the Physicians skill despised, or thought uselesse; so I wish that the Physicians skill may not make him dispise good Receipts. For we have often seen (especially in outward affections) not only Empericks and Chirurgeons, but even Ladies and old Wives, with a lucky composition prescribed by a Receipt, perform more constant and easie Cures of the particular Distemper, for which that Receipt is proper, than even Learned Physicians by their extemporary, though pompous and Artificiall Prescriptions. And the illustrious Lord *Verulam* (one of the most judicious Naturalists that our Age can boast,) thinks fit to take notice of it as a Deficiency, that Receipts by long Experience approved, are not more closely, and as he speaks *religiously* adher'd to, but altered upon every light occasion; And in the same Chapter to answer the Principal, as well as the most obvious Objection in this Matter, "That, sayes He, any man induced by some Specious Reason should be of opinion, that it is the part of a Learned Physician (respecting the Complexions of Patients, their Age, the season of the Year, Customs, and the like) rather to accommodate his Medicines as occasions suggests, then to insist upon some certain Prescripts; is a deceivable Assertion, & which attributes too little to Experience, too much to Judgment. And a little above He goes much farther than we pretend to do, for speaking of the Neglect of the use of particular Receipts, which, as He speaks, by a kind of propriety, respect the Cure of particular Diseases, He addes, severely enough, ("That the Physicians have frustrated and taken away the fruit of Traditions, and approved Experience by their *Magistralities*, in adding and taking out, and changing Ingredients of Receipts at their
"pleasure

*De Augment.
Scient. Lib. 4.
cap. 3.*
The Lord *Verulam*s judgment, That approved Receipts ought not to be altered, but religiously adher'd to,

*Crato*s judgment had herein, and the Author concurs with that Eminent Physician

“pleasure, and almost after the manner of Apothecaries, putting in *Quid pro quo*, commanding so presumptuously over the Medicine, as the Medicine can no longer command the Disease. Thus saith our Judicious Author: But I will rather choose to expresse to You my sense on this whole Subject of Receipts, in the Words of that Experienc’d Physician to three Emperours, *Johannes Crato: De Morbi Natura* (sayes He) *causa, loquere affecto, Medicus diligenter cogitet, atque in eo plus quam in certis medicamentorum mirificis formis situm putet. Medicinam tamen expertam cum ratione adhibitam plus valere quam ea qua interdum subito à Doctissimo etiam Medico magna ratione exhibita excogitatur, non dubito: Atque hac in parte Rationales etiam Medicos Empeiricis cedere debere de sententia Hippocratis statuo.* Only I must adde by way of Explanation, That this Sentence is to be understood to expresse my sense, when the Medicines used are not very extraordinary, but such as *Crato* employed, and hath left us in his Writings: for there may possibly be such effectuell Specificks, and such powerfull and commanding Remedies, that the Efficacy of the Medicine may (at least in some particular Diseases excuse and repaire much want of skill in the Prescriber.

If the Testimony of *Helmont* concerning the *Arcana* of *Paracelsus* be considerable, even in a Tract (where either out of Emulation or Judgement, he endeavours somewhat to depreciate both them and their Author) much greater things might be boldly affirmed of some *Arcana*; for *Fateor Lubens*, (sayes he, speaking of *Paracelsus*) *Me ex ejus scriptis profecisse multum, illumque potuisse, per Remedia ad unitatis Symbolum adscendentia, sanare Leporam, Asthma, Tabem, Paralysem, Epilepsiam, Calculum, Hydropem, Podagram, Cancrum, atque ejusmodi vulgo incurabiles morbos: attamen Paracelsum fuisse ignarum radices vite longa, tam ex ejus scriptis & medicaminibus quam ex Obitu collegi, &c.* And in the same Tract, just before He comes to enumerate *Paracelsus*’s *Arcana*; *Concedo*, saith he,

Const. 312.

Helmont, in *Arcan. Paracels.* pag. 787.

Of the greater *Arcana*, and more Universal Medicines, the Efficacy of which may compensate for want of skill in the Prescriber. *Helmont*, in *Arcan. Paracels.* pag. 790.

Universales aliquot Medicinas, quæ sub unisono Natura longe gratissimo, insensibiliter post se victum educunt hostem, cum egregia Organorum depuratione; Concedo pariter appropriatas aliquot quo Universalis amplitudinem in specificis morborum directionibus amulantur. And among those *Arcana* themselves that is rank'd but in the second place, of which he gives this Character: *Sequitur dein Mercurius Vita, Stibii proles integri, quæ omnem morbi nervum penitus absorbet.*

And because another *Arcanum* doth not so powerfully renovate, as that last mentioned, and two more; He allows to those three others the precedencies of that whereof He yet saith: *Quarto loco est Mercurius Diaphoreticus; melle dulcior & ad ignem fixus, solis Horizontes omnes proprietates habet: perficit enim quicquid Medicus & Chirurgus possint optare sanando.* But because, that any Medicines should be qualified to deserve such superlative Encomiums, may seeme a thing fitter to be wished than credited, I would not dissuade You till the Chymists Cures have made good their Matters brags, to be altogether of our Authors Mind, who somewhere professes: *Se morbum non distinguere, si Remediis* (sure he speaks of such Remedies as he thought he had) *sit summa bonitas.* But yet you may perchance ascribe much more even to Remedies far interior to the *Arcana Majora*, in the cases wherein they are most proper, than many are willing to believe. Inso-much that I have sometimes observed with wonder, that an Excellent Person (whom I need not name to You) Cures the Rickets generally in Children of severall Ages and Complexions without having hitherto failed (as she professes) in any one, by prescribing no other Remedy than the single use of the above described *Colcotharine Flowers*, which I presented Her with. And a couple of Physicians also, to whom I recommended them, tell Mee, They have tryed in the same Disease with the like success, as this Lady hath hitherto met with. And I remember that eminently Learned & experienc'd Physician

Dr.

The Sum and Conclusion of the point in controversy.

Dr. *G. Boast*, (of whose skill both your excellent Mother and You have had good proof) solemnly assured me, as I elsewhere also note, That he knew a Physician who constantly cured within two or three Fits all Agues, whether recent or radicalled, in Persons of all Ages, Sexes, and Complexions, indiscriminately with one single outward Application to the Patients Wrists; but that this envious Doctor would never part with it to our Friend, or any else, no not upon his Death-bed: only Dr. *Boast* discovered, That Spiders or something coming from them were main Ingredients of his *Pericarpia*.

And indeed there are certain Preparations and Compositions of Remedies so lucky, and whose Success doth so much exceed Expectation, and the Efficacy of common Compositions: that the same Physician, whose they are, may upon severall Occasions prescribe an Hundred others, each of which he may think as rationall as any of those, which nevertheless shall be all of them much inferiour thereunto. And therefore I wonder not, that the most Learned of the Methodists themselves have much valued and celebrated some peculiar Processes and Receipts, as here amongst us (to mention no others) the Famous *St. Theodore Mayerne*, was wont almost in all Obstructions, Cachexies, and Hydropicall Distempers to magnifie and use that peculiar Salt of Steel of his, which he was pleased to call *Anima hepatis*.

And to these Domestick Instances (which I might easily accumulate) of the esteem eminent Physicians have made of Receipts, I might adde very many Forreign ones, Nay *Galen* himselfe, who has so copiously treated of the *Materia Medica*, and the *Composition of Medicaments*, though he were sufficiently expert at drawing up Receipts, doth yet in his Book *De Compositione Medicamentorum*, and elsewhere transcribe, and sometimes commend (and mention his having used) divers of the Compositions of Ancient Physicians, and especially magnifies *Andromachus* his Treacle.

I might, *Pyrophilus* here mind You, That we see that Chymistry, as incomplete as yet it is, has been able so much to improve the preparation of Remedies, as to afford us some, which are so innocent as well as Efficacious, that in the Diseases they principally respect, they require not, as of Necessity, neer so much of Theoricall skill, as others do in the Administer; I might likewise take notice, That experience also teacheth, especially by what we see performed by the *Spaa*, and some other Minerall Waters, that one Medicine may be so richly endowed, as to be more effectual against several Differing Diseases, than even the better sort of other Remedies against any one particular Disease.

I might further represent as some thing that makes yet more to my present purpose, that though every Body can advise his sick Friends to an Air that is famously healthful, if there be any within a convenient Distance from them; Yet there are some Aires so eminently good, and that not upon the Account of any one predominant Quality that makes them opposite to a Disease springing from its contrary, but from a hidden Temperature, or certain friendly *effluvia*, that they alone often cure Variety of Diseases in Persons of differing Ages and Complexions: as Navigators observe in the Isle of *S^t. Helen* where the *Spaniards* and some other *Europeans* in their passage to the *Indies*, often leave without Physicians great numbers of Sick, whom they find for the most part recovered at their return. And that sometimes even the acutest Diseases may by the Sanative Steams that enrich the Air be cured almost in a trice, is assured by those that have lived in grand *Castro*, who have affirm'd to me, what the learned *Prosper Alpinus*, who so long practis'd Physick there, assures Us, That upon *Nilus's* beginning to overflow, though in the Heat of Summer, there ensueth a suddain Recovery of those multitudes of Persons of differing Ages, Temperatures, Sexes, &c. which there happen at that time to lye Sick of the

the Plague. These things I say, *Pyrophilus*, and more I might adde, to what You may find dispersed here and there in the *Essays* which this Paper accompanies towards the inferring that we should not hastily conclude it *impossible* that there may be found such Medicines as may be more than particular and Specifick Remedies without requiring the Giver to be a great Physician. But to draw at length to a Conclusion, I shall rather Summe up my present thoughts of this Matter, Thus.

Ordinary Receipts without an Ordinary Measure of skill in Physick are not rashly to be relyed on, especially in Acute Diseases; where, by giving Medicines, otherwise innocent enough, to lose the opportunities of administering proper ones, may be very prejudiciall: and where sometimes the several seasons of the Diseases do require such differing Remedies if they be but Ordinary ones, that a Medicine proper enough for the Disease at one season of it, may do Mischief at another: But if indeed there be Noble and Extraordinary *Arcana*, that work rather by strengthening and restoring Nature; and Resolving, or otherwise destroying, the peccant Matter they find any wherein the Body, than by irritating and weakening Nature or putting Her as it were to a troublesome Plunge: the use of such Remedies may deserve to be a little otherwise considered, as that which may not Ordinarily (for I say not Ever) require more Instruction then may be afforded to Persons not Indiscreet by such Directions and Cautions as may be Divulged, or otherwise Communicated, together with the Remedies themselves: As we sometimes see that by the help of such Instructions unlearned Persons, and even old Wives do with some one Sovereign Plaister, Balsam, or other outward Remedy, Cure many and various Tumors, Ulcers, and other Sores in Persons of differing Sexes, Ages, and Complexions. And because You will easily grant that this Example does far lesse accommodate our present purpose than

ccc

does

does the Case it self, as I just now put it, I hope You will allow me to represent further, That at least it seems not so Rationall to judge of all the Remedies that Art improving Nature can afford us by those that are hitherto in Use, either among Methodists or Vulgar Chymists, but rather to think that the Nobleneffe of Remedies will be advanced according as the Art of preparing them shall be promoted; and that it is not so safe and easie, positively to determine the Efficacy of the former, otherwise than in Proportion to the Discoveries we have attained to in the Latter.

The End of the APPENDIX.

The



The CITATIONS *English't.*

AD Pag. 6. *In Corpore, &c.* But I dare not try those things upon Humane Body, which have not been before tryed upon former Experiences; For the End of such rash Experiments may be the ruine of all Lives.

Ad Pag. 9. Naturalium, &c. This is the Course of Naturalists and Physicians who prosecute their Art Philosophically, The Naturalist ends where Medicine begins, and Medicine begins where the Naturalist endeth.

Ad Pag. 11. Sunt enim, &c. The parts of Humane Body are unknown, and therefore we ought to consider them by the parts of other Animals, to which they are like.

Ad Pag. 19. Hoc in, &c. This I have more than once Observed in *Lizards* which I kept in my own House. For my Children being at play, when with a Rod they had strook off the *Lizards* Tails I saw them within a day or two come out to Feed, and their Tayles then by little and little still encreasing and growing bigger.

Ad pag. 73. Neque, &c. Nor may we be ignorant that in acute Dileases, the Notes of Life or Death are more fallacious.

Ad pag. 75: Quidam, &c. One who before he fell into the French Pox was blind of a Cataract in one of his Eyes, by being anointed with Quick-silver, was recovered, not only from the chief Disease, but (which was most strange) from his Cataract. Nor is it irrationall that Cataracts should be dissolved by such anointing: when Experience teacheth, That hard Tumors clogg'd together of pituitous Matter are powerfully dissolved by Mercuriall Inunctions.

Ad pag. 78. Ejusque, &c. And they urge many Instances of it even to my admiration.

Ib. Aiumt, &c. Yet they say that the Seed of the *Calchoor*, grown'd, and taken in any proper Water doth dissolve the Stone into a very Dirt, which being voided doth harden again into a stony substance. I saw a Young Man, to whom (upon my knowledge) this accident befell. When he was tormented with the Stone in the Bladder, which I understood both by the Lithotomist who felt it, and by the Symptomes which he suffered: I sent him to a Fountain, which takes its name from *St Peter*: when he had staid there two Moneths, he returned Free from the Stone, and brought home with him all the Dirt which he had voided by degrees, in a Paper, coagulated as it were into fragments of Stone.

Ad pag. 85. Hic, &c. He loaths nothing that stinks, or is otherwise unpleasant, He hath been often seen to chew and swallow Glasse, Stones, Wood, Bones, the Feet of Hares, and other Animals together with the Hair, Linnen, and Woollen cloath, Fishes, and other Animals alive: Nay, even Mettals, and Dishes, and Globes of Tin. Besides which, he devours Sewer, and Tallow Candles, the Shells of Cockles, and the Dungs of Animals, especially of Oxen, even Hot, as soon as it is voided. He drinks the Urine of others mixt with Wine or Beer, He eats Hay, Straw, Stubble, and lately he swallowed down two living Mice, which for half an Hour continued biting at the bottom of his Stomack, and to be short, Whatsoever is offered him by any Noble Persons, it goes down with him without more adoe upon the smallest reward, insomuch that within a few Dayes he hath promised to eat a whole Calfe Raw, together with the Skin and Hair: Among divers others I my self am a Witnesse of the Truth of these, &c.

Ad pag. 86. Canfam, &c. To find in the Carcasse, the cause of this Voracity, will be questionlesse very difficult: Some one perchance would referre it to that which *Columbus* observed in
the

the Carkasse of *Lazarus* the Glasse-eater, and resolve that the fourth conjugation of Nerves which nature ordain'd for tasting, come neither to the Palate, nor the Tongue: But so there would only be rendred the cause of his want of Taste, and not why he should be able to take such uncouth things without offence to his Stomack and digest them, which without doubt ought to be the particular and singular constitution of his Stomach and Guts, which yet may not appear to the Eye by the Effects.

Ad pag. 91. De Laudano, &c. Of his *Laudanum* (that Name he gave to little Pills, which in the extremity of Diseases he administred as a most Divine Medicine, alwayes giving them in an odde Number) he scrupled not to affirm that by that Medicine he could put life into those who were as good as Dead; and that while I was with him, he made good in some Experiments.

Ad pag. 94. Oportet ubi, &c. Where a Medicine answers not, we ought not so much to esteem the Author as the Patient, and to try somewhat farther and farther.

Ad pag. 97. Idem fit, &c. The same is made of *Mandioca*, Potato's, Turkish Mullet, Rice, and other things which being chewed by old Women, and Spit toge her with much Spittle, this Liquor is strait put up into Vessels, and there kept untill it ferments and cast down a Sediment.

Ad pag. 103. Hoc est, &c. This *Birchwater* hath a sweet Sharpnesse and very pleasant Taste; it allayes Thirst, and the crynesse of the Entrails; It tempers the Heat of the Blood; It opens Obstructions, and drives out the Stone.

Ad pag. 111. Conficiunt, &c. They make Drink of that *Mulli*, rubbing it gently in their hands in Hot-Water, untill they have rubb'd out all the Sweetnesse; they straine that Water, and keep it three or four Dayes, untill it settle, and then it becomes a very clear Drink: The same Water boil'd turns into good Hony-- Of this Fruit boil'd with Water according

to different Manners is made Wine, or good Drink, or Vinegar, or Hony.

Ad p. 112. Porrò, &c. Then by cutting the Shoot with a Razor-blade made of a Flint, there runs out of the Cut a certain Liquor in such a quantity, that (which is wonderful) out of one single Plant, sometimes Fifty or more *Aròba* run out: From which Liquor there is made Wine, Vinegar, Hony, and Sugar. For the Liquor Sweet of it self, is by being boil'd made much sweeter and thicker, so that it at length kerns into Hony.

Ad p. 113. Semel, &c. If once in a Moneth one eat or Drink to excess, the Day following, if he be weigh'd (though he hath suffered no sensible Evacuation) Yet then he will weigh lighter then is Usual. A constant Diet wants the help of those that once or twice in a Moneth do exceed: For the Expulsive Faculty being oppressed by too great Repletion stirs up so much of perspiration, as without the Staticks no one would believe.

Ad p. 123. In urbe, &c. In the City *S. James's* that is in the Province of *Chyle*, certain Captive *Indians* cut off the Calves of their Legs, and for hunger eat them, and (which is strange) applying the leaves of a certain Plant to their Wounds, immediately they stanch the Blood.

Ad pag. 124. Memini, &c. I remember that the Limbs of Soldiers wounded with Gunshot, to have been cut off by the advice of our *European* Surgeons, both *Dutch* and *Portugall*; those Barbarous people by recent juices Gums and Balsams to have freed them from Knife and Cauterries, and happily cured them. I also am an Eye-witnesse, that with the juice of Tobacco alone, they have cured Wounds given over by our Surgeons.

Ad pag. 131. Experimentis, &c. It is approved by many Experiments, that its Virtues are excellent against the Plague, Malignant Feavers, the bitings of Venemous Creatures, the *Diarrhœa* and other Fluxes.

Ad

Ad pag. 135. 'Nam venena noluit, &c. He made not *Venome* to be our Poison, for neither made he Death nor any Deleterey Medicament upon the Earth; but so, that by a slight industry and endeavour of our own they might be turned into great pledges of his love, for the Use of Men against the cruelty of Diseases, which were in proceſſe of time to ariſe. For in thoſe Venomes is the help that more benigne and familiar ſimples cannot yield; and thoſe moſt frightfull Poisons are yet preſerved in Nature for the more great and Heroick uſes of Phyſicians.

Ad pag. 136. That the *Lapis Cancrorum* reſolved into the form of its firſt Milk, affords an Antidote againſt the violence of many Vegetables that are infamous for their being over laxative.

Ad pag. 150. Mille, &c. Our Court hath tryed the Efficacy of this Salt in a thouſand Experiments in the Diſeaſes of Melancholly, in all Feavers, continuous and intermitten, in the Stone, Scurvy, &c. Nay more wee have obſerved more than once that it hath procured ſleep, eſpecially in perſons Melancholly. The Doſe is from one, to two Scruples; we uſe divers pounds of it in a Year.

Ad pag. 150, 151. Caterum quantum, &c. But for the exceeding and portentous Virtues of the Bezar-stone, I have found by a thouſand tryals that they are not ſo very great.

Ib. Nil porro, &c. I ſpeak no more of theſe Stones, leſt I ſhould ſeem by my Commendation of their Virtues to provoke Lithotomiſts to make diſſections at any rate. This I have moſt certainly Experienc'd, That the Stone found in Mans bladder doth well provoke Urine and Sweat. And particularly in the time of that Plague, which in the Years 1624. and 1625. miſerably vexed Ours, and all other the Cities of *Holland*, for want of the Bezar-stone, I remember, I preſcribed this and found it, (let me tell You) a more great an excellent Sudorifick.

Ad

Ad pag. 159. Credo, &c. I believe Simples in their own simplicity are sufficient for the Curing of all Diseases.

Ad pag. 19. Quod, &c. But if You come not to that *Arcanum* of *Pyrotechny*, learn at least to make the Salt of Tartar Volatile, that by means of it You may perfect Your Solutions. Which though it leave those things which it dissolveth equally Homogeneous, being digested in Us; Yet it borroweth some of their Virtues which it carrieth along with it self to overcome Diseases.

Ad pag. 199. Dicam, &c. I will speak it for their sakes, who are ingenious, that the Spirit of Salt of Tartar, it it dissolveth Unicorns Horn, Silver, Quicksilver, Crabs Eyes, or other like Simples, it will Cure not only Feavers but other Diseases in great abundance.

Ib. Mirum, &c. It is a wonder what the very Salt of Tartar alone being made Volatile will perform; for it cleanses the Veins of all the feculencies and the causes of Contumacious Obstructions, and doth disperse the congregated Matter of Apostems. Of this Spirit of the Salt (and not of the Oyl) is that saying of *Paracelsus* true, That whither this Medicine cannot reach, there is scarce any other more powerful that shall reach it.

Ad pag. 201. Ars, &c. Art is Long, Life is short. But where the End is by gift, there Art is short, and Mans Life long if it be compared to Art. Therefore *Hippocrates* had reason to make the complaint, for it even happened to his followers according to his Words. The Art of Medicine consists in Philosophy, Astronomy, Chymistry, and Physicks, and therefore it may truly be said that the Art is long. For there is much time required, thoroughly to learne and search these fower Pillars of Medicine.

Ad pag. 202. Est enim, &c. For this Art is conjecturall; and not only Conjecture, but Experience it self doth not allways answer.

Ib.

Ib. Haec mihi, &c. Experience is Uncertain, and Fallacious Judgment is difficult to be made.

Ib. Hoc modo, &c. And this was the fashion of Medicine in the beginning, that it had no Theory, only Experience, that such a thing was Laxative, such a thing Astringent: But how, or why they were so, that was not found out; and therefore one was healed, another perisht: but now, &c.

Ib. Per rationem, &c. By reason it is not easie in a Disease to give Judgement, but is as difficult as any thing imaginable.

Ib. Neque, &c. For if the truth were easie to be found, so many and so excellent men as have made it their businesse to find it, had never been divided into so many Sects and Opinions.

Ad pag. 203. Non titulus, &c. It is not a Title, nor Eloquence, Nor skill in the Tongues, nor the Reading of many books (though these are Ornaments) which are to be considered in a Physician; but a prime knowledge of Matters and Mysteries which alone may stand in the steed of all the rest. It is the part of a Rhetorician to speak eloquently, to be able to perswade and to draw the Judge to his own party. It is the part of a Physician to know the severall sorts of Diseases, their Causes and Symptomes, and then with skill and industry to apply Medicines and to make Cures of them all, according to their severall Natures and Fashions.

Ad pag. 207. Imo, &c. Nay, I saw divers, as it were in an instant, redeem'd from death who had been poisoned by the eating of Venomous Mushrooms and other unwholsome things, only by drinking a recent Infusion of the Root *Jaborand*, whilst my self and other of *Galens* Disciples blusht to see the ineffectuall endeavours of all our *Alexipharmaca*, Treacles, and other Antidotes: So that afterwards I suffered my self to be joyn'd in Consultation with those barbarous Collegues, not so much to be *arbiters* of the condition of our men by their Pulse, as to give their assistance and counsell in the fore-mentioned way (*viz.*) the prescribing of proper Medicines.

d d d

Ad

Ad pag. 208. Hujus, &c. The Virtue of this Stone is much above that of any other gems; for it stops the Flux of the Blood in any part.--- When the Women perceive a fit of the Mother coming upon them, by applying this Stone they are immediately eased, and if they alwayes weare it, they are never troubled with those fits more. Of this they make faith, by many Instances.

Ib. Vidimus, &c. We have seen some that were troubled with the Flux of the *Hæmorrhoides*, who found Remedy by wearing Rings made of that Stone continually on their Fingers, and the Monthly Flux is stayd by the same way.

Ad pag. 209. Pregnantibus, &c. This Stone is not proper for those who are with Child, for it is so sure to cause Abortion, that the Women of *Malaica* told mee, that if at any time their Monthly Evacuations were obstructed, that if they only carried this Stone in their hands, they found Remedy thereby.

Ad pag. 210. Hoc loco, &c. In this place I cannot but relate the admirable Vertues of our *Electrum* which I have observed with my owne Eyes, and therefore can attest with a good Conscience. For we saw Rings of it which he that wore neither felt Cramp, nor Palsie, nor other pain. He was subject to no Fits of Apoplexie, nor Epilepsie, insomuch that if one of these Rings were put upon the Ring-Finger of a person actually in any vehement fit of the Falling sicknesse, that fit would immediately assuage, and the person as soone come to himselfe.

Ad 225. In the City *Posso*, where I lived certain Yeares, a certaine *Indian* cured all sorts of Diseases by the juice of one Plant alone, wherewith he anointed the Limbs and any other part particularly affected, and then covering them warme with Blankets provoked Sweat. The Sweat that came from the parts so dawbed were meere Blood which he wiped off with Linnen Clothes, and so he proceeded untill he thought they had

had Sweat enough. In the meane time he gave them Diet that was most Nourishing. With this Remedy many desperate Diseases were cured, and the sick person upon the Use of this Physick improved, so as to appeare younger and lustier after it. But we could never prevaile, neither by Money, nor intreaty, nor foule meanes upon him to shew us the Plant.

Ad pag. 227. Mira, &c. Wonderfull things are daily found out in Physick to the Confirmation of the Operation of the Learned Naturalist *Petrus Serenius's* Weapon Salve. For he assured us that a piece of Cloth dipt in the Blood, and put under hot Ashes stops the Monthly Flux; the Experiment having been often proved. And my Master *Petrus Castellus* affirms, that he found by Experience, that the *Hemorrhoids* if they were touched with the tuberous Root *Chondrilla*, did dry away if the *Chondrilla* dried; and did Run to Corruption if the *Chondrilla* was corrupted. And therefore after such touching of the Hemorrhoids, the *Chondrilla* was usually put to dry in the Chimny.

Ad pag. 229. Podagra, &c. The Gout is strangely eased, if Puppies lie with the person that hath the Gout, for they contract the Disease so as not to be able to go, but the Patient thereby findes Ease.

Ad pag. 336. Primo, &c. At the first, Physick was accounted part of Philosophy, so that the Cure of Diseases, and the Contemplation of Nature, did both arise under the same Authors. Those being most set upon Medicall Enquiries, which had made their Bodies infirme by disquieting thoughtfulness, and nocturnall Watchings.

Ad pag. 204. Est, &c. Besides, it is altogether drying; and therefore I should not despaire that it, being hung about Childrens Necks, might cure the Falling-sicknesse in them. I truly saw a Lad, that sometimes would be eight whole Moneths free from the Falling-sicknesse, and then, when by chance this fell from off his Neck, he became immediately

surprized with a Fit : and againe , hanging another Root in its place , he would continue well ; Therefore , for Experiment sake , I thought good to take it againe from his Neck , which when I had done , and found that the Lad fell into his former Convulsions , we tooke a great piece of a greene Root , and hung it about his Neck , and from that time He continued well and felt no more Convulsions . It was therefore most probable , that either certaine parts did exhale from the Root , and were drawn into the Body by Inspiration , which did so worke upon the affected parts ; or that the ambient Aire was continually changed and altered by the Root : For after this manner the *Succus Cyrenaiscus* cures the *Phlegmone* upon the *Uvula* ; so Catarrhs and other Rheums are dried up by *Melanthisum* , if it be tyed up warme in fine Linnen , and the hot fume of it be drawne up into the Nostrils by Inspiration . Nay , if you strangle a Viper with divers sorts of Threeds , and especially with the Sea Purple , and then you tye those threeds about the neck of your Patient , you shall cure the swelling of the Almonds of the Eares , and all other swellings in the Neck .

" *Ad pag. 257. Pests Ceyri, &c.* The Plague at *Grand Cair* , and in all parts of *Egypt* , is wont to invade the Inhabitants from the beginning of the Moneth *September* untill *June* : For in all these Moneths , from *September* unto *June* , the Plague from other Nations is brought thither , and is wont to infect that Nation : But in the Moneth of *June* , of what nature and how great soever the Pestilence be , when the Sun first enters *Cancer* , it is immediately removed ; which thing many (and that not without reason) take to be a particular Mercy of God . But (what is more admirable) all Household-stuffe , how ever infected with the Contagion of the Disease , at that time shews no effect of any Contagion , so that then the whole Nation passes into a most secure and healthy condition , from a morbid and dangerous : and then those Diseases , which are called by

by the Greeks *Sporadici*, begin to appeare, which in no part of the World are seen to be rife together with the Plague.

Ibid. Hac, &c. These things are first observed about that time. From which, I think, and perchance not without reason, the cause of the extinction of the Plague, and the change of the state from Morbid to Wholsome doth depend; For no other of the conservative Causes, which are wont to be called by Physicians, *Res non-Naturales*, appeareth then, besides the Aire: to which we may referre this change from Disease to Healthinesse, and therefore we must referre this change to the change of the Aire.

Ad pag. 259. The Inhabitants do strange things, both in preserving Health and curing Diseases, by Friction and Unction, using the first in cold and Chronicall, the latter in acute Diseases. And Strangers who arrive there, are, as they ought, willing to imitate their waies of Physick, & by rules of Art to prelide and moderate these waies of Emperical healing.

1b. Cholera Sicca is cured by the same Remedies, especially if their Horny Cupping-glasse be applied to the Region of the Liver, of which I must attest the same thing that *Galen* doth of Cupping-glasses, which he affirmed to Worke as Miraculously as if their Operation had depended on Enchantment.

Ad pag. 271. Neque, &c. Nor doth he say, that a Physician needs nothing of Councell or Deliberation, or that an irrational Man may professe this Art. But that those Conjectures of hidden things are nothing to the purpose. Because it matters not what causeth the Disease, but what removes it.

1b. Interim, &c. In the mean time the *Brazilian* Brotanists make all sorts of Medicines of Simples they find every where in the Woods: which they make with so great Sagacity, and apply them both internally, and externally, especially to Diseases that Spring from Venom, that a man may more securely give himselfe over to their hands, than to our unskillfull Physicians, who brag much of Secrets they have learnt in pri-

vate, and for the knowledge of these will be called *Rationals* in Physick.

Ad pag. 272. Fortassis, &c. Perchance so me Sciolist in Physick may affirm that these things may not be used, by reason of the Narcotick and Stupefactive property. But these pretences are as vain in effect as specious at first sight: for besides that the hot temper of this Countrey requires it, It is sure, that without these Remedies there can be no Cure. Adde that here we prepare *Opium* so well that you may give it to an Infant. And truly, if in Hot Diseases we had no Opiats we should in effect find that the use of all other Medicaments would prove altogether vain and fruitlesse.

Ad pag. 287. Si Medicinam, &c. Such was the Origine of Physick: by the Recovery of some, and the Death of others it first made distinction between things Sovereigne to heale, and things which were improper and Deadly. And thus the Remedies being found out, Men began to dispute of the Reasons of them. Nor was the Art of Medicine found out by the light of Reason; but, Medicine being found, the Reason began to be inquired into.

1b. Ubi res, &c. Where the Matter is certaine, if it be against the common Opinion, the Reason must be sought, and not the Matter of fact scrupled.

Ad pag. 297. Paucissimos, &c. You will find very few of those who dwell at the Spaa who are troubled with the Headache, Stone, Obstructions of the Kidnies, Liver, Spleen, or Mesariack Veines; none at all who were troubled with the Jaundice, Dropsie, Gout, Itch, or Falling-sicknesse.

1b. Inter cetera, &c. Among other Qualities it moveth the Monethly Evacuation as hath been prov'd by a thousand trials. And yet it stops the immoderate Flux of them more happily than any other Medicine.

Ad pag. 299. Rerum, &c. The Contemplation of Nature, though it maketh not a Physician, yet it fits him to learn Physick.

F I N I S.

617

Mr BOYLE of { Naturall and
 { Experimentall
 { Philofophy.

The INDEX to the Second Part.

The Second Part Of the Usefulness of Natural Philosophy.

S E C T. I. Of its Usefulness to
P H Y S I C K.

E S S A Y I.

Containing some Particulars tend-
ing to shew the Usefulness of
Natural Philosophy to the Phy-
siological part of Physick.

THe advantage of the Knowledge
of Nature towards the increas-
ing the Power of Man, and its Use as
to Health of the Body and Goods of
Fortune. pag. 3.

That in Man's Knowledge of the
Nature of Creatures consists his Em-
pire over them. 4.

That the Discovery of America
is owed to the Knowledge of the Load-
stones Polarity. 5.

That the Martial affairs all over
the World were altered by the Know-
ledge of the Nature of Brimstone and
Saltpeter. ib.

How prejudicial the mistake of
that Aphorism (that if teeming
Women be let blood they will mis-
carry) hath been to Femal Patients. 5

The interest of this Knowledge to
the Happiness and Life of Man. 6

The enumeration of those Arts to
which this Knowledge is profitable. 7.

The Method or way intended for
the ensuing Discourse. ib.

The Division of Physick into five
parts. 8

How the Physiological part of
Physick is advantaged by the Know-
ledge of Natural Philosophy. 9:

That the Anatomical Doctrine
of Man's body receives light from
Experiments made on other Crea-
tures. ib. Proved by divers Instan-
ces, as of the finding the Lacte-
als and Lymphæ-ducts first in Brui-
t Bodies. ib

The Experiment of taking out the
Spleen in Dogs. 10. The same thing
done by Fioravanti in a Woman. ib.

The Respiration of Frogs divers
Hours, sometimes Daies, under wa-
ter, without suffocation. 11:

What use Aristotle and Galen
made of the Dissections of Brui-
ts. 11

The Anatomy of Man counted now
in Muscovy for inhumane, and the
use of Skeletons for Witchcraft. 12

The Use of the comparison of the
parts

ffft

The INDEX.

parts of Humane Body with those of Beasts. *ib.* Illustrated by divers particular Observations. *ib.*

Divers Motions and Actions of Frogs after their Hearts were cut out. 14

Observations of the motion of a Chicken's Heart after the Head and other parts were cut off. 15

Of the Vivacity of dissected Vipers, 16. and Tortoises. *ib.*

Whether there be a necessity of the unceasing influence of the Brain to Sense and Motion. 17

That the Silkworm butterfly is capable of Procreation after the losse of its Head. *ib.*

That the Rednesse of the Bloud is not to be ascribed to the Liver proved by the inspection of the Liver of Chickens unhatcht. 18

That the loss of a Limb in all Animals is not irreparable. *ib.*

That notwithstanding the great Solution and Digestion of Meat in the Stomachs of Fishes no sensible Acidity is found there. 19

Experiments concerning the Solution of Meats, and their change of Colours by acid Menstruums. 20

Wayes of Artificial Drying and preservation of Plants, and Insects, 22. and more bulky Bodies. 23.

Particularly the Schemes of divers parts of Humane Body. *ib.*

Of the preservation of an Embryo divers Tears by Embalming it with Oyl of Spike. 24.

Instances of men in the American Mountains kill'd, and afterwards preserv'd from putrefaction only by the Wind. 25

Of the use of Spirit of Wine for the preservation of Bodies from putrefaction. *ib.*

That the Examination of the Juices of Humane Bodies by the Art of Chymistry may illustrate their Use and Nature. 26

That the Actions which are common to Men with other Animals being perform'd Mechanically, the Skill of Mechanicks must be of Use to Physiology. 27

ESSAY II.

Offering some Particulars relating to the Pathological Part of Physick.

That the Naturalists Knowledge may assist the Physitian to discover the Nature and Causes of Diseases. 28. Prov'd by general Reason 29. By particular Instance of the Cause of the Stone in the Kidnies. 30.

The cause of that Disease illustrated by the Petrification of Wood, Cheese, Moss, Water, &c. 31.

The

The INDEX.

413

The Origin of Helmonts Offa alba, and Paracellus his Duelech by the mixture of Spirit of VVine, and Spirit of Urine, an example of the Generation of the Stone. 32.

That a terrestrius Substance may lark undiscern'd in limpid Li- quors. ib.

The Use of Chymistry in explain- ing the Nature of, and aberrations in, our Digestions. 34. *prov'd by a Catalogue of considerable Observa- tions.* 35.

That Salt and Sulphur have more influence in the causation of Disca- ses then the first Qualities of Heat, Cold, &c. 36.

Observations made upon the Li- quor that distends the Abdomen in the Dropsy. 37.

Observations on the Calculus Humanus. 38.

Of the changes that may reasona- bly be thought to happen to our ali- ments within the Body. 40. *Illu- strated by the Example of Juices out of the Body.* 41, 42.

Difference between vulgar and true Chymistry. 43.

The Use of the Knowledg of Fer- mentation. ib.

Of Periodical Effervences in the Blood without Fermentation. 43; 44.

Of the use of Zoology to the Know- ledge of Diseases. 45.

Helmont's Error refuted, that the Stone is a Disease peculiar to man. 46.

That the Venome of Vipers or Ad- ders consists chiefly in the Rage and Fury wherewith they bite, and not in any part of the Body that hath at all times a mortal property. 48.

A certain Cure for the biting of Vipers. 50.

Of external Application of Poi- sons and letting them into the Veins of beasts. 51, 52.

Postscript.

Experiments of conveying Li- quid Poisons immediately into the Mass of Blood. 53, &c.

ESSAY III.

Containing some Particulars rela- ting to the Semiotical Part of Physick.

That the Improvement of the Therapeutical would alter the Prog- nosticks in the Semeiotical part of Physick. 56. *An Instance to that pur- pose in the Peruvian Bark.* 57, 59, 68 *and in Riverius's Febrifugum, and New Cure of the Kings evil.* 59.

That though no Disease should be incurable, yet every Disease is not curable in every Patient. 60.

That the Hope of doing greater Cures

The INDEX.

Cures then ordinary, hath engaged
Artists to make profitable Trials. 61
Examples of some unexpected
and strange Cures. 62, 63
Examples of the Cure of Cancers. 64
An Example of a Cure of one
that was born with a Cataract in
the Eye. 65. and other Examples
of Cataracts strangely cured. ib.
Examples of the Cure of the
Drop sic and Gout. 66, 67
Examples of the Cure of the Stone.
68. The use of Perficaria for that
Cure 69. Instances in other Medi-
cines for the same Disease. 70. The
Use and Success of Millepedes. 71.
The Argument concerning the Incu-
rability of the Stone answered 72.
That there may be a Liquor, able to
dissolve the Stone that may not be
corrosive to any other part. 73, 74
Examples of those who could di-
gest Metals and Glass. 75, 76, 77
The Descriptions of a Menstruum
prepar'd from common Bread, able
to draw Tinctures from pretious
Stones, Minerals, &c. 78
Helmont's Arguments from the
Providence of God censured. 80
The Argument that Paracelsus
made, that in the 47th year of his Age
he was cured of his Stone. 81
The use of Paracelsus his
Laudanum. 81
Butler's great Remedies 82

ESSAY IV.
Presenting some things relating to
the Hygieinal Part of Physick.
That the Knowledge of Fermenta-
tion is useful to make our Drinks
wholsome for Aliment. 85
How much Simples may be alter'd
by Preparation, exemplified by the
Indians, making Cassavy out of the
poisonous Plant Mandioca. 86. Odd
unhandsome wayes of their making
Drink from the same Root. ib.
Of making Drink from sorts of
course Bread. 87
The Drinks in use in China. 88
Of Chery wine. 89
Of Excellent Ciders. 89
Of Hydromel. ib. Of Sugar Wines. 90
Of other Brasilian and Barbada
Wines. ib.
The way to make Wine of Raisons. 91
Of Wines from the dropping or
Weeping of wounded Vegetables. ib.
Of the Tears of the Walnut tree. 90
The Use of the Tears of Birch,
(with some other Ingredients) for the
Stone. ib.
The wayes to preserve these Li-
quors. 93
The use of the Tears of Birch
in

The INDEX.

<i>in hot distempers of the Liver, and hot Catarths.</i> ib. <i>The use of Daucus Ale, and proportion of the Seed to the Lignor.</i> 94 <i>Of The or Te.</i> ib. <i>Of Animal Drinks.</i> 95 <i>The use of Brandy-Wine in hot Climates.</i> ib. <i>The use of Natural Philosophy to meliorate Meats.</i> 96 <i>Of preserving Bisket from putrefaction.</i> 97 <i>Of preserving Fruits.</i> ib. <i>Of preserving Meats roasted for long Voyages.</i> 98 <i>Of preserving Raw meats.</i> 99 <i>Of salting Neats tongues with Salt-peter.</i> ib. <i>Of preserving Flesh in spirit of Wine.</i> ib. <i>Of conserving by Sugar, and making Sugar of other Concretes besides the Cane.</i> 100, &c. <i>That the Naturalist may find out new ways to investigate the wholesomeness or insalubrity of Aliments, proved by Instances out of Sancto-rius his Medicina Statica.</i> 103 <i>The difference in transpiration betwixt the times after ordinary Diet, and after Excess, tryed by the weighing of Man's body.</i> 104 <i>Difference in the weight of EVA-</i> ib.	<i>That Chymical Experiments may discover other qualities in Waters.</i> 105 <i>That the Naturalist may discover the qualities of particular Airs.</i> 106 ESSAY V. <i>Proposing some Particulars, where- in Natural Philosophy may be useful to the Therapeutical Part of Physick.</i> <i>The Introduction.</i> 107, 108 <i>That the Naturalist may invent Medicines Chymically prepared more pleasant than the ordinary Galenical ones.</i> 109 <i>An Instance in Resin of Jalap, Mineral waters, and the Author's Pil: Lunares.</i> 110 <i>That the Naturalist may find out inward Medicines able to do Chirurgi- cal Cures, proved by divers Instances.</i> 111, 112 <i>St W. Rawleigh's Cordial.</i> 113 <i>What great use the Indians make of the Juice of Tobacco.</i> 114 Chap. II. <i>That the Search of Nature by Chymistry in particular discovers the Qualities of Medicines.</i> 114, &c. <i>Of the Nitro-tartareous Salt in some Vegetables.</i> 116 <i>Difference in Operation between Acid and Alcalizate Salts.</i> ib.
--	---

The INDEX.

*Of Ink made by the Decoction of
divers astringent Plants with a little
Vitriol.* 117

Of some Metalline Precipitations.
ib.

*That Sulphureous Salts turn the
expressed Juices of Vegetables into
a Green colour.* 118

*Of the Distillation of the Calculus
Humanus and of the Concretions
that are called Lapides Cancro-
rum.* ib.

*The changes in Animal Substances
made by Fermentation only in
Urine.* 119

*Of the mixture of Spirit of Salt
with digested Urine.* ib.

Chap. III.

*That this search of Nature adds
much to the Materia Medica.* 120.
*by employing Bodies hitherto not em-
ployed.* ib.

*Of Remedies newly prepar'd out
of Zinck.* ib.

*The Cure of the Dropsy by the Pil.
Lunares.* ib.

Of the use of divers Medical Earths
121. *Instances of Gold, and divers
Menstruums drawn out of them.* 122

Of Medicines out of Arsenick.
123. *out of Bismutum.* 124

*Of the Correction of Poisonous
Medicines.* ib.

*The Preparation of Asarum turns
it from being Emetick to be notably
Diureticall.* 126

*Instances in some of the secret
Menstruums.* ib.

*That the Preparation of Asarum
is only the Boiling it in common wa-
ter.* 127. *That the boiling it in Wine
alters not its violence.* ib.

*That the Emetick and Cathartick
properties of Antimony are de-
stroy'd by Calcination with Salt-
Peter, and Mercury sublimate may
be depriv'd of its Corrosivenesse by
bare resublimations with fresh Mer-
cury.* ib.

Chap. IV.

*A strange correction of the Flow-
ers of Antimony.* 128

*That the Naturalist may assist the
Physitian to make his Cures lesse
chargeable.* ib.

*Inconveniencies of stuffing Re-
ceipts with a multitude of Ingredi-
ents.* 129, &c.

*That Acid, and Alcalizate Salts
being mixed grow thereby more fix-
ed, & yield in Balneo but a Phlegme*
135. *The same is observ'd of the
Mixture of Spirit of Urine (by its self
highly Volatile) and Spirit of Salt.* ib.

Chap. V.

*That the Naturalist discovers
the*

The INDEX.

- the Mis-application and Use of* 147
Gems, and divers other costly Ingre-
dients. ib.
A difference between the fixed-
ness of a Gem, and of Glasse of Anti-
mony. 136
Concerning Aurum Potabile 137, 138
Examples of great Medicines drawn
from unpromising Bodies. 139
The D. of Holslein's Panacea du-
plicata is made of the vulgarly de-
spised Caput Mortuum of Aqua-
fortis. ib.
Flores Colcotharini are made of
the Caput Mortuum of Vitriol. 140
A Comparison between the Be-
zar's Stone, and the Stone cut out of
Mans Bladder. ib.
Medicines out of Soot. 141
The use of Horse-dung. 142
An Arcanum of Ivy-Berries. ib.
Medicines out of Mans Urin. 142
Medicines out of Blood. 144
The great Effects of Millepedes in
the Stone. ib. *In Suffusions of the*
Eyes. 145. *And real Cataracts.* 146.
In sore Breasts and Fistulas. ib.

Chap. VI.

That the Naturalist discovers
how much of the cost and labour in
making many Chymical Remedies

- may be spared.* 147
A Comparison of Chymical Re-
medies with Galenical ones in point
of Cheapness. 148
Of the use and commendation of
Simples even by the most able Chy-
mists. ib.
Powder of Pearl more Operative
the Magistery. 149. *So crude Hart-*
horn then Magistery. 150
An excellent Simple Medicine
to stanch Blood. ib.
Another like Medicine for spit-
ting and vomiting of Blood. 150
That many times Chymists by
their tedious and injudicious pre-
parations alter the Medicine and
make it worse. 152
So the dissolving the Salts of
Vegetables in Aqua. fortis to make
them pure and Chrystalline alters
their vertues, and makes them in-
flammable as Salt-peter. 152, 153
The Preparation and vertues of
the Balsamum Sulphuris Crassum.
 156, 157
The Preparation and vertues of
Essence of Harts-horn. 158, 159

Chap. VII.

That Mechanicks and other ex-
perimental Learning may teach how
to lessen the charge of Cures by ma-
king

The INDEX.

king more convenient furnaces demonstrated in divers particulars.

160, 161, &c.

Glasſe ſtopples fitteſt for corroſive Liquors.

163, 164

That inflammable ſaline Sulphureous ſpirits may be drawn from other ſubſtances cheaper then Wine.

165

Instances in divers particulars how the Naturaliſts may find cheaper waies of Heating the Chymiſts Furnaces.

166

Of charring Coles, ſo that while it charres it gives an intenze heat fit to melt or calcine Minerals.

167

Of Charring Peat.

ib.

Of Digeltion and Diſtillations without Fire.

169

Wayes of Diſtilling ſpirit of Vine. 170. Of Diſtilling it with Lime without Fermentation.

ib.

That ſo diſtill'd it doth not coagulate ſpirit of Wine as in the uſual Diſtillation.

ib.

Of the power of good Menſtrums in facilitating Diſtillation.

171

That the calcination of Gold is facilitated by Amalgamation with Mercury.

172

The power of Verdigreſs diſtilled in drawing Tinctures of Glaſſe

of Antimony, &c.

ib.

That the Naturaliſt may find out wayes to preſerve Medicines longer, and better then is uſual.

173

Of ſuming Liquors with Sulphur: ib. And adding a little of the white Coagulum made of the pure ſpirits of Vine and Urine.

ib.

That the moſt principal way of leſſening the charge of Cures would be the finding out New and more effectual Remedies.

174

An Hiſtory of a radicated Epilepſie that was cured by the Powder of Miſſelto of the Oak.

175

Chap. VIII.

Other proofs that the Naturaliſts ſkill may improve the Pharmaceutical preparation of ſimples.

177

Of the beſt waies to correct Opium.

178

Of the beſt way of correcting Mercurius vitæ.

ib.

An Excellent Medicine made of thoſe churliſh Minerals, Quickſilver and Antimony.

179

Wayes to take away the Vomitive faculty of Antimonial Glaſſe.

180,

181

A New and excellent way to get the Primum Ens, or Eſſence of ſome Vegetables.

181

The

The influence of these Prima Entia to cause renovation or rejuvenescence. 183, 194

Of Helmont's Via Media of Elixir Proprietatis. 193. *And the perfuming it by cohobations with Musk and Amber.* ib.

A commendation of Helmont's Medicines. 194

Of the power of Chymistry. 195

Of the power of Noble Menstruums, particularly. ib.

The power of Sal-Tartari Volatized. 197

Of the possibility of Violatizing it. ib.

That there may be other Menstruums besides such as are Acid, Urinous, or Alcalizate. 199

How these severally disarm and destroy one another, and that what an Acid Menstruum dissolves an Urinous or Alcalizate will precipitate. ib. *Of a Menstruum unlike to all these.* ib.

Chap. IX.

That Chymistry it self much more (Physiology) is capable of affording a New and better Methodus Medendi. 200, &c.

Instances, to prove that the unusual Efficacies of New Remedies may alter, and make the method of

Curing more compendious. 203. *In the Kings-Evil.* ib. *In Plurifies.* 204. *In the Rickets.* ib.

Chap. X.

That great Cures may be done by outward Applications. 206

Of the efficacy of Lap's Nephriticus, and divers other Appenda. 207, 208

The Cures of the Dropsie and Schirrhus Lienis, by the external application of Sponges dyed in Lime-water. 209

Of strange Cures perform'd neer Rome in the Serpentine Grotta. ib.

Of the operations of Sulphur Cantharides and Quicksilver, and Tobacco externally applied. 210

Instances in divers Medicines which have differing effects inwardly given, and outwardly applied. 211, 212

That preparation may much improve Simples which are outwardly applied. ib. *Instances in divers preparations of Gold.* ib.

An Oyntment made of Aurum fulminans for the Hæmorrhoids and Venereal Ulcers. ib.

The Cure of a Person esteem'd bewitcht by an appended Mineral. 213

Of the power of Jasper to stanch Blood. 213

The INDEX.

Blood. [214](#)

The Incontinentia Urinæ cured by the powder of a Toad, burnt alive, and hung about the neck. [215](#)

Effects ascribed to Witchcraft cured Per appensa. [216](#)

Paracelsus cured Quartans by a Plaister. [217](#)

Diseases cured by Frights. [218](#)

Physick now in China in a good condition, without Phlebotomy, Potions, or Issues. [219](#)

Where Practitioners of Physick are illiterate, there Specificks may be best met with. [220](#)

The usefulness of the knowledge of the Medicines of Barbarous Nations. [220, 221, 222](#)

A Comparison of this Empirick part of Physick with the Rational. [223](#)

Chap. XI.

Of other Extraordinary Medicines which work by Magnetisme, Transplantation, &c. [224](#)

The Cure of an Ulcer in the Bladder by the Sympathetick Powder. [225](#)

The effects of the Weapon salve and other Magnetical Remedies. [226](#)

Observations of the Transplantation of Diseases. [228, &c.](#)

The sometimes not succeeding of

Magnetical Medicines, no sufficient cause to abandon their Use. [231](#)

Chap. XII.

Instances of divers Cures upon Brutes, and how these are applicable to Men. [232, &c.](#)

Chap. XIII.

That the handling of Physical Matters was antiently thought to belong to the Naturalist. [235](#)

That the rejecting Specificks, because they make no visible Evacuation is irrational. [236](#)

That great changes may be made only by displacing without any Evacuation of the parts. [237](#)

The making of Vinegers is an Instance of this truth, especially in the Indies. [ib.](#)

Instances in Sura, and the Juice of Mandioca. [ib.](#)

In the Effects of Thunder, and Earthquakes. [238](#)

Divers Instances to prove, that invisible Corpuscles may pass from Amulets, and cause great alterations in the Juices of a mans Body. [ib.](#)

Galen's Example of Peiony-Root, &c. [239, &c.](#)

Of purging by the Order of Potions. [241](#)

Of the Purging and Vomiting Quality

The INDEX.

62

Quality of the Air of the Mountain
Pariacaca. 242, 243

The power of Steams seen in the
Infectious Effluvia. 243

Of alterations made by the Pas-
sions of the mind. ib.

Chap. XIV.

Divers Instances of the power of
Imagination. 244

An Instance of the Hair of the
Head chang'd in Colour upon a sud-
den Fear. 245

How the Authors discourse con-
cerning the power of Effluvia ought
to be understood. 246

That the particular State or dis-
position of the Engine of Humane
Body, is considerable as to the effects
of these Impressions, 247, &c.

The effects of the Mols growing
on humane skull in stanching Blood. 251

Burnt Feathers or the Smoake of
Tobacco remove Hysterical fits. ib.

Cures of Dysenteries by Fumes.
ib.

And by sitting on a hot Anvil.
252

Cures of the Colick by Glysters of
the Smoak of Tobacco. ib.

Of other cures done by Smoak. ib.

Of the sudden ceasing of the Plague
at Grand Cayrd in June. 254

Chap. XV.

That Humane Body may be al-
ter'd by such Motions as Act in a
Grosse, and meerly Mechanical man-
ner, prov'd by divers Instances. 256

The Instance of the cure of the
biting of the Tarantula by Musick,
particularly modified. 275

Chap. XVI.

Divers instances of the idiosyncra-
sia, or peculiar aversion of particu-
lar persons from particular things,
and of the commotions made in the
Body thereby. 259

That since the Body receives such
alterations frō such unlikely things,
there is no just arguing against Spe-
cificks, because they operate not by
any obvious Quality. 262

Of the Operations of Poysons, and
Antidotes. 263

What is to be done when the Spe-
cifick seems likely to encrease the
Disease 265

Chap. XVIII.

A Disquisition concerning the Or-
dinary Method of Physick. 266, &c.

Instances of some Medicines con-
demn'd for Noxious, which yet have
prov'd useful. 269

Of the Use of Guaiacum for Con-
sumptions, and Mercury for Pal-
sies. 270

g g g 2

That

The INDEX.

That there are divers Concretes, as
to sense similar, whose different parts
have contrary Qualities, as Rhu-
barb, and Oyle Olive. 271

Of improbable Cures, viz of a Plu-
rise by a Laudanum Opiatum. 272

Of curing Coughs and Consump-
tions by Saline Medicines. 273

Of the curing histical Consump-
tions by the acid Smoak of Sulphur.

ib.

The Use of the Livers and Galls
of Eels, in expediting the hard la-
bour of Women. 274

The unlikely cure of Venome by
Oyle of Scorpions. 275

And of Fluxes by fresh Butter
melted. 276

Chap. XIX.

That it is very hard to give an
intelligible Explication of the Ope-
ration of Elective and other com-
mon Medicaments, which are not
Specifick. 277

That Poysons do respect particu-
lar parts, and therefore Medicines
may do it. 278

General Explications of the man-
ner, how, these Operations of Specif-
icks may proceed. 279

That Vinegar will operate on the
shell, and not upon the other parts of
the Egge, with like instances of spe-

cifick operations. 281

That Physick, as it began by Ex-
perience, so it must be enlarged and
rectified by the new discoveries of
Experience. 282

That the Operations of the An-
timonial Cup, Glasse of Antimony,
and Crocus Metallorum, would not
have been credited in antient times.

284

Divers other Instances alike in-
credible. ib.

A strange Cure of blindness by a
Mercurial powder. 287

Chap. XX.

Of Universal Medicines. 287

That the same matter may cause
divers Diseases. ib.

And the same Medicine cure them.

288

An Instance in the Waters of the
Spaa. 289, 290

Of the reason and design of the
Author's discourse concerning the
Methodus Medendi, and his de-
scending to other particulars which
may be thought improper for Him.

291, 292, &c.

That this Employment is better
than the more fashionable of destru-
ctive valour. 298

That the Angels charitable employ-
ment at Bethesda, is more desirable
than

The INDEX.

than his who destroyed in one night
180000. fighting-men. 299

AN APPENDIX to the First Section of the Second Part.

Advertisement touching the following Appendix. 303, 304, &c.

To the 69. Page.

The Irish Lithotomists Receipt, for the Stone in the Bladder. 306

To the 110. Page.

[*Where the Virtues of the Pilulæ Lunares are toucht at.*] 307

The Preparation of the Pilulæ Lunares. 308, &c.

The Dose and use of these Pills. 310

To the 113. Page.

(*Where mention is made of the Cure of one concluded to have a Gangrene, by an inward Medicine*) 311

Sr. Walter Rauleighs Cordial, after S R: K: his way: (set down Verbatim at the Author received

it.)

How to make the Tincture of Coral for this Cordial. 312
313

To the 113. Page.

[*Where a Receipt that cured Fistula's is mentioned.*]

A Water for a Fistula, and all manner of Wounds, and Swellings, or old Ulcers, Cankers, Tetters, Boils, or Scabbs in any place, or Green Wounds. 314, 315.

To the 141. Page.

Where Soot is mentioned. 316

Hartman's preparatton of Spirit and Oyle of Soot. ib.

The Authors Directions concerning preparations from Soot. 317

To the 143. Page.

Of the use of the Preparations of Urine. 318, 319.

To the 144. Page.

Of the Preparation of Mans Blood. 320, 321.

Observations touching the manner of drawing the Volatile Salts and Spirits of Blood and other substances belonging to the Animall Kingdome. 322, &c.

How to draw Tinctures, at of Sulphur, &c. with the Saline Spirits 3

The INDEX.

<i>rits</i>	329	<i>That Bucks horns may be substituted for Stag-horns.</i>	348
[To the 154, 155, &c. where Ens Veneris is treated of.]	330	<i>How to keep the Spirit and Salt of Harts-horn.</i>	ib.
<i>How the Author first hapned upon the Preparation of Ens Veneris.</i>	330	<i>Of the Spirit of Sal. Armoniack and divers attempts and wayes of preparing it.</i>	350, &c.
<i>The Process used by the Author for the making Ens Veneris.</i>	331	<i>Of Preparation of Saline and Sulphureous Fetid Liquors.</i>	356
<i>Divers Particular Animadversions concerning these Preparations.</i>	332, &c.	<i>The way of making the common Balsam or Ruby of Sulphur.</i>	357
<i>The Dose and Use of Ens Veneris.</i>	338	<i>To Volatize the Balsam of Sulphur.</i>	ib.
To the 156, 157, 158, 159, and 160. Page.	339	<i>Penotus his preparation of a Sulphureous Balsam, with the Authors Advertisements upon it.</i>	358
<i>Of Harts-horn.</i>	ib.	<i>Of an excellent Balsam of Sulphur made only with Oyle-Olive.</i>	360
<i>Three wayes of distilling Harts-horn.</i>	340, &c.	<i>The common way of preparing it.</i>	ib.
<i>Animadversions on some preparations of Harts-horn of Glauber and Hartman.</i>	342	<i>Other wayes of preparing this Balsam.</i>	363
<i>A fourth way of preparation of Harts-horn used by the Author.</i>	344	<i>A Balsam of Antimony.</i>	364
<i>Of the Use and effects of Spirit and Salt of Harts-horn and the Dose of it.</i>	345	<i>Of the obscure and Cryptical way of Writing of Chymists.</i>	365
<i>Q. Whether in the Distillation of Harts-horn the Salt dispose it self into the Figure of the Horn.</i>	347	<i>Concerning the Emphyreuma of Chymical Extracts and their offensiveness, compared with the Galenical, and those which are commonly used by Methodists.</i>	397, &c.
		<i>And</i>	

425

The INDEX.

*And whether the offensiveness of
divers Chymical Medicines proceed
from the violence of the Fire, or the
Nature of the Matter?* 168

*A Way of taking off the Fetidness
from Spirit of Urine, Harts-horn,
&c.* 373

*Observations concerning this Me-
thod of taking off the Empyreuma.*

374
*Of the Medicinal Quality of these
aromatized Salts.* 375, &c.

[To the 156 Page, Where
the Author promises a Declaration,
how he would have his Praises of
Medicines understood.] 389,
390.

*Divers Disadvantages of Chy-
mical and Empirical Physick in the
way of usual Ministration:* 391

*That Chymicall Processes stand
more in need of clear relations, than
Galenicall.* 392

*Errors in the Time and Dose of
Chymicall Remedies.* 393, 394.

*That a competent Measure of
Knowledge is absolutely necessary to
a Practizer of Physick.* 395

*The L. Verulam's Judgment,
That approv'd Receipts ought not to
be altered, but religiously adhered to.*
398

*Crato's judgment heretn, and
how the Author concurrerth with that
Eminent Physician.* ib.

*Of the greater Arcana and more
Universal Medicines, the Efficacy
of which may compensate the want
of skill in the Prescriber.* 399

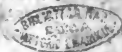
*The Summe and Conclusion of the
point in controversie.* 400.

FINIS.



Reader,

FOr Expedition sake this second Impression was committed to severall Presses, which occasioned the mistake of putting the Pages of the former Impression to the Citations Englished at the end of each part in this: but they being referred to, as well by one or more of the Latin words of each Quotation, as by the Page, and being Printed in order as they lye in the Booke, thou wilt easily find where each is Englished.





PANDIMIGLIO

21 DIC. 1970

LEGATORIA - ROMA

